GOV'T REVIEWS COLD FUSION (AGAIN) • EXTRAORDINARY CLAIMS • EXPLAINING INTUITION

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON
Volume 29, No. 2 • March / April 2005

EVOLUTION — AND — EVIDENCE

One Longsome Argument

Defending The Peppered Moth Studies

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- **Asteroid and Meteor Impact Hype**
- **Ringing False Alarms**

The Glaring Garret Ghost

Published by the Committee for the Scientific Investigation of Claims of the Paranormal

THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION
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Why the Peppered Moth Remains an Icon of Evolution

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Skepticism and Media Scares

The American public gets from its news media a steady stream of "wake up calls" to panic over—daily or weekly alerts of things to worry about, crises to address. Though many of these problems are real, others are little more than phantom fears. Since the news media give us no way to distinguish the real problems from the exaggerated ones, the best antidote is a healthy dose of skepticism.

BENJAMIN RADFORD

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Since 1878, the horror-stricken face of Henry Wells has supposedly glared from the garret window of the Pickens County Courthouse in Carrollton, Alabama. Is it real?

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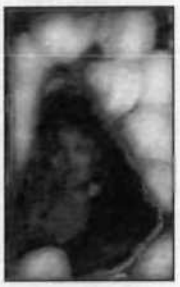

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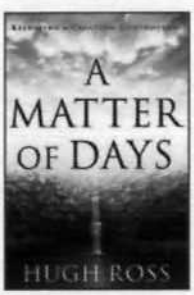

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EDITOR'S NOTE

Evolution and Evidence

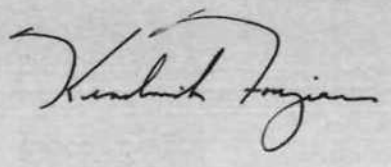
Evolution is exceptionally successful as the scientific explanation of observed changes over time in the living world, but its public acceptance has always been another matter. And the situation may be getting worse.

A Gallup poll of American adults in November 2004 found that only 35 percent said that in their opinion the theory of evolution is well-supported (another 35 percent said it was not well-supported and 29 percent said they didn't know). To another question, on the origin of human beings, 45 percent said they believe God created humans in their present form, counter to all anthropological and other evidence that humans, like all other living things, have evolved from ancestral forms. Evolution's enormous scientific success has not permeated into the public consciousness.

In his elegant lead essay in this issue, "One Longsome Argument," Dennis Trumble considers the many reasons why that is so (one, of course, is that creation-by-design beliefs are instilled at an early age by well-meaning parents and then endlessly reinforced by religious institutions) and points out that few of us understand the basic workings of science well enough to appreciate "how feeble the arguments against evolution really are." Writes Trumble, "Creationists of every stripe have come to rely on an assortment of pseudoscientific arguments" to legitimize their beliefs, "hoping against hope that the extensive tapestry woven by seven generations of scientists might somehow dissolve with the tug of a few loose threads." He addresses some of the confused arguments they make, including several of the common misconceptions invoked by Intelligent Design advocates about how the physical world really works. And he shows how advances in many areas of modern science have continued to tighten "the weave of evolutionary theory."

The second article in our "Evolution and Evidence" section concerns a very specific piece of textbook evidence for evolution that has been much under attack, the case of the peppered moths. Matt Young and Ian Musgrave examine the recent claim by journalist Judith Hooper that key data from the 1950s by evolutionary researcher Bernard Kettlewell were faked or manipulated. With their own mathematical model and quantitative analysis, Young and Musgrave demonstrate that variations in Kettlewell's data fall within normal experimental variation. That and the fact that you can recapture more moths when you release more show, they write, that "there is no foundation for assuming that Kettlewell's data were manipulated. . . . The peppered moth properly remains a valid paradigm—no, an icon—of evolution."

We realize there are other creationist criticisms of the peppered moth evidence, most notably by Jonathan Wells in his book *Icons of Evolution?* Those criticisms have already been answered. One good set of rebuttals, by Alan D. Gishlick of the National Center for Science Evolution, is posted on NCSE's excellent Web site at www.ncseweb.org/icons/icon6moths/html. Gishlick's analysis is subtitled, "Why much of what Jonathan Wells writes about evolution is wrong." I highly recommend it as well.



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New Government Peer Review Leaves Cold Fusion Still Out in the Cold

KENDRICK FRAZIER

A new government peer review of scientific claims for cold fusion has left the matter pretty much where it was fifteen years ago when the first such review was undertaken—out in the cold. It finds no conclusive demonstration of the main assertions about cold fusion. Like the first one, it leaves open the possibility that something useful might still be discoverable through individual peer-reviewed experiments but nevertheless calls for no special program of research.

The low-key review was conducted by the U.S. Department of Energy's Office of Science at the behest of proponents of cold fusion. DOE issued the report December 1, not announcing it via a news release but simply making it available to those science reporters who had expressed interest. The tactic seems to have kept the matter from erupting into another big controversy on the subject.

The topic isn't even called cold fusion but "low-energy nuclear reactions." The new DOE review was set up at the request of a group of proponents who in late 2003 asked that DOE revisit the question of the scientific evidence.

SKEPTICAL INQUIRER readers may remember that in March 1987 two researchers, B. Stanley Pons and Martin Fleischmann, created a sensation—and an immediate storm of public and scientific controversy—when they called a news conference to report the discovery of tabletop nuclear fusion in a palladium electrochemical cell. They reported "excess" heat in the cell and attributed it to fusion of deuterium atoms, something that until then had been thought possible only at enormous temperatures and pressures.

Strong doubt about the validity of the claims quickly surfaced, and the furor continued for several years. In 1989 DOE's Energy Research Advisory Board reviewed the data. It did not recommend establishment of special programs within DOE devoted to the science of low-energy nuclear reactions but said peer-reviewed experiments were acceptable. Since then some universities, companies, and agencies have funded research, and some scientists involved contended some of the claims had been validated.

As a result of the new request, DOE's Office of Science agreed to undertake another review of work performed since 1989. It asked the scientists who made the request to prepare a review document identifying the most significant experimental observations and publications and where they thought additional work was warranted. Five proponents authored that review document: Peter Hagelstein (MIT), Michael McKubre (SRI International), David Nagel (George Washington University), Talbot Chubb (Research Systems Inc.), and Randall Hekman (Hekman Industries). They submitted their document, "New Physical Effects in Metal Deuterides," to DOE in July 2004.

The Basic Energy Sciences and Nuclear Physics Offices in DOE's Office of Science conducted a peer review of the submitted material in a manner, their report says, "typical for a DOE sponsored university of laboratory research program."

There were two components. First the review document was sent out by mail for peer review to nine scientists with backgrounds in experimental and theoretical nuclear physics, material science, and electrochemistry. They were given approximately one month to review the material.

The second part of the review was a one-day review conducted August 23 by nine additional scientists chosen by DOE for their relevant expertise. These reviewers had the comments from the nine anonymous mail-in peer reviewers. They also heard oral presentations by proponent scientists chosen by the authors of the review document. There were six one-hour presentations.

Everyone involved was asked to respond to three issues: 1) to evaluate the evidence for nuclear reactions in condensed matter at low energies of only a few electron-volts, 2) to determine whether that evidence was conclusive to demonstrate nuclear reactions, and 3) to determine whether there is a scientific case for continued study, and if so, on what basis. (The proponents' review document was positive about all three issues.)

The results of the review contained a little bit of something for everyone but, in the end, no convincing case for anomalous fusion. They are in a five-page document "Report of the Review of Low Energy Nuclear Reactions."

To the first question, according to the report, "Two-thirds of the reviewers commenting did not feel the evidence was conclusive for low energy nuclear reactions, one found the evidence convincing, and the remainder indicated they were somewhat convinced. Many reviewers noted that poor experiment design, documentation, background control, and other similar issues hampered the understanding and interpretation of the results presented."

As for the second, similar question, the review was even more negative. "The preponderance of the reviewers' evaluations indicated that Charge Element 2, the occurrence of low energy nuclear reactions, is not conclusively

demonstrated," says the report. "One [of the eighteen] reviewers believed that the occurrence was demonstrated, and several did not address the question."

The third question provided some support for further research, common in such reviews. "The nearly unanimous opinion of the reviewers was that funding agencies should entertain individual, well-designed proposals for experiments that address specific scientific issues" relevant to the questions under review, the report said. "These proposal should meet accepted scientific standards and undergo the rigors of peer review. No reviewer recommended a focused federally funded program for low energy nuclear reactions."

Some specific areas of basic research that might be helpful in "resolving some of the controversies in the field" were suggested.

The ultimate conclusion: "While significant progress has been made in the sophistication of calorimeters since the review of this subject in 1989, the conclusions reached by the reviewers today are similar to those found in the 1989 study."

Proponents of cold fusion tried to put a positive face on the review. SRI International's McKubre, one of the five authors of the review document examined by DOE, was gratified at the "mildly positive" endorsement of further research.

But James F. Decker, deputy director of DOE's Office of Science, said the department was indeed open to proposals for cold fusion research but added that was not new. "We have always been open to proposals that have scientific merit as determined by peer review," he said.

"This was a very, very scientific, very level-headed review by everybody," Kirby W. Kemper, vice president for research at Florida State University and one of the reviewers of the oral presentations, told the *New York Times* (December 2). "I don't think we've made much progress since '89. . . ."

Kendrick Frazier is editor of the SKEPTICAL INQUIRER.

PBS Premiers *NOVA ScienceNow*

The Public Broadcasting System has begun a new science-magazine program that's spun off from the network's popular series, *NOVA*. *NOVA scienceNOW*, which premiered on January 25, 2005, will run five episodes in 2005, covering such diverse topics as the life cycle of the *T. rex*, the threat of hurricanes to the Big Easy, the ant-farm inspiration of robot builder James McLurkin, and the brain chemistry of sports fans.

The series is hosted by ABC News correspondent Robert Krulwich, familiar from that network's nightly news and *Nightline*, who will be backed by other science journalists covering the latest from the world of science and technology. Where *NOVA* focuses on a single subject in each episode, *NOVA scienceNOW* will offer faster-paced coverage of a number of topics. Check the schedule of your local PBS affiliate for air dates and times or go to www.pbs.org or www.wgbh.org for updates and descriptions of upcoming episodes.

Psychic Detectives Fail in the Real World but Succeed on TV

Charles Capel was last seen alive May 20, 2004, the night before he wandered away from his home in Oxford Township in rural Butler County, Ohio. The retired university professor, who suffered from Alzheimer's, could not be found despite repeated searches by police and volunteers. In October, frustrated by a lack of leads, Oxford police enlisted self-proclaimed psychic detective Noreen Renier in the search. For a $650 taxpayer-funded fee, she described the area where Capel would be found. Acting on Renier's information, police renewed the search but still found nothing. Weeks and months dragged on without a break in the case until December 1, when Capel's body was discovered less than a mile from his home, in an area the police apparently missed.

According to a news report in the *Oxford Press*, "The small patch of cornfield-surrounded woodland where Capel was found possessed uncanny similarities to the area psychic detective Noreen Renier described to police. . . . Though in Virginia, hundreds of miles away from the scene, she was able to envision bits of his journey through contact with his shoes and toothbrush." A local television station was similarly impressed, airing a report titled, "Psychic Clues Accurate in Case."

Sgt. Jim Squance of the Oxford police is quoted as saying that he "was struck by the similarities" between Renier's description and where Capel was eventually found: "The landmarks were all there . . . she said there was a tower with an antenna on top of it." Renier also mentioned stone, a wooded area, barns, and a creek. "We based our search on the information that she gave us, and, as it turns out, she was right on," Squance said. "Professionally, you have to be a little skeptical, using a psychic detective. But personally, when you see the results, you've got to be in awe."

Sgt. Squance's awe is hard to fathom. An objective look at the facts suggest that Renier's information was both unremarkable and unhelpful. The police received her assistance in early October, yet two months elapsed before Capel's remains were found—not by police directed by Renier to a specific area, but by a local hunter.

Missing Alzheimer's patients are almost always found close to home, a fact borne out by statistics and well known to police (and "psychic detectives"). So just about everyone—the Capel family, police, searchers, and Renier—was pretty certain that the eighty-one-year-old Capel was somewhere nearby. All Renier needed to do to be "right on" was describe the immediate area, with such obvious and general features as a creek, trees, a tower with an antenna, and stones. (Sgt. Squance countered that other local places Capel

might have ended up—such as a nearby university—presumably would not have matched Renier's description.) The fact that Renier was reportedly in Virginia when she got the visions doesn't mean much; it's likely that at some point the police described the search area, or she could have easily guessed or determined the area's general terrain from news reports or the local map sent by police.

Renier's "information" simply suggested an area that common sense dictated and where the Oxford police were already searching. Claiming, after the body was found, that in retrospect the psychic "was right on" doesn't cut it. Renier, apparently playing the odds and a pretty obvious guessing game, managed to impress both the police and the general public (through credulous media reports).

In February 2003, Renier was hired to locate Laci Peterson. Renier said that she gave "a lot of information" to Modesto, California, detectives. Yet once again, Renier's information was useless to police; Laci Peterson's body was discovered not by Renier—nor even by police investigators—but instead by a passerby who saw it washed up in a bay shore on April 14, 2003.

On her Web site, Renier claims "uncanny success," and repeatedly states that she has lectured at the FBI Academy in Quantico, Virginia. According to Joe Nickell, author of *Psychic Sleuths*, "Renier once caught the attention of a credulous FBI profiler and was invited to give a talk at the academy. However, she was never an instructor there nor did she work on cases as a psychic for the FBI as some have been led to believe."

Psychic detectives on television will likely have more luck than those in the real world. In February 2004, Court TV launched a new series about psychic detectives called, rather unimaginatively, *Psychic Detectives*. For those viewers who thought that psychic powers were unproven and of dubious use to police, Court TV sets the record straight: "Police departments all over the world have been actively using psychics for over 300 years to help solve cases. In the world of criminal investigation, they have helped not only in crime solving but also in fine-tuning the gut instinct of a seasoned detective. Court TV's new half-hour series *Psychic Detectives* . . . tells the fascinating stories of detectives and psychics as they work together to solve some of law enforcement's toughest cases. . . . *Psychic Detectives* will hear investigators and psychics share the uncanny tips and unexplainable clues that have helped solve the unsolvable." The series proved so successful that Court TV ordered fifteen additional episodes for its 2005 season.

Along similar lines, *1-800-Missing*, a crime drama on Lifetime Television, was the most-watched series premiere ever for the female-targeted network, reaching 3.3 million total viewers. The series features a female FBI agent (Vivica A. Fox) who teams up with a young psychic to help her locate missing people. The series was brought back for the 2005 lineup, retitled simply *Missing*. The show's Web site links to several actual missing-children organizations, perhaps lending an air of legitimacy to the show.

Not to be outdone, on January 3, NBC launched *Medium*, its own "chilling drama series inspired by the real-life story of research medium Allison Dubois." (The show began with the titles, "There really is an Allison. . . Really.") Patricia Arquette stars as Dubois, a law student who begins to suspect that she can talk to dead people, read people's minds, and see the future. With pluck and confidence, she dispels doubts and shows up skeptics—including her rocket scientist husband and police investigators. Her abilities are far more impressive than those of real-life psychic detectives: At one point Dubois leads a group of Texas Rangers to find a missing child's body. In contrast to the typical vague, post hoc predictions about where the body is, Dubois stands in a field, points to the ground, and says the body is "right here, about three feet down."

The show's Web site claims that "Dubois has consulted on a variety of murders or missing persons cases while working with various law enforcement agencies including the Glendale Arizona Police Department, the Texas Rangers, and a County Attorney's Office in the Homicide Bureau." Unfortunately for Dubois, the Glendale police and the Texas Rangers tell a different story. "The Texas Rangers have not worked with Allison Dubois or any other psychics," spokesman Tom Vinger stated flatly. Glendale police spokesman Michael Pena stated that the detective who handles missing persons cases "does not recall using Dubois at all in [one specific] case, or in any other cases." Readers must weigh a self-promoting psychic's credibility against that of respected law enforcement agencies.

It seems that psychic detectives are making a strong comeback in the media, in news reports, in "documentaries," and in fictional entertainment. Perhaps the only good news is that *Crossing Over with John Edward* was not renewed for the 2005 season.

—Benjamin Radford

Benjamin Radford is a writer, managing editor of the SKEPTICAL INQUIRER, *and Editor Jefe of* Pensar, *the Spanish-language skeptics magazine.*

Bin Laden Dead, Powell President? Psychics' Predictions for 2004 Missed Big Time

Osama bin Laden died of kidney disease. Saddam Hussein was shot to death. Fidel Castro died. A live dinosaur thousands of years old was captured. The Hoover Dam collapsed. And Rosie O'Donnell adopted Siamese twin girls.

That's what happened in 2004—at least that's what would have happened if predictions for 2004 made a year earlier by some of the world's best "psychics" were right.

Science journalist Gene Emery, a contributor to SKEPTICAL INQUIRER, has been tracking tabloid forecasts for twenty-six years.

He once again finds that psychics are abysmal in their record for accuracy—

not surprising since science has never documented any so-called psychic ability in the first place. Truly unusual predictions of major news events almost never come true, and this past year was no exception, said Emery, who has been using the predictions to search for a psychic—any psychic—who can really predict the future.

Non-dead Osama bin Laden.

Not only did the psychic forecasts fail to foretell what would happen in 2004, the psychics continued their tradition of missing the major events that did make the headlines.

For example, this past year, they missed Janet Jackson's Superbowl breast flash (which caused one of the biggest stirs of 2004), the prison torture in Iraq (which most Americans found so surprising and profoundly disturbing), and the World Series win by the Boston Red Sox.

"But then, why should this year be any different?" said Emery. "Although the psychics were always predicting things for Princess Diana, they completely missed her death. The same was true for the September 11 attacks [News & Comment, January/February 2005]. And the fact that the psychics, who claim to be able find everything from missing bodies to your missing car keys, have not helped us find Osama bin Laden should tell you something."

"Given their track record, it's amazing that a psychic can tell you when the 10 o'clock news is going to come on," he joked.

According to the psychic forecasts released in December of 2003, 2004 was supposed to be the year Americans developed a taste for pressed bricks of dried plankton, giant animal bones were discovered on Mars, and Colin Powell was elected president after switching parties and trouncing George Bush.

Non-president Colin Powell.

One psychic predicted that Saddam would be caught in 2004. It was published after the dictator was captured in mid-December of 2003.

One of the few tabloids still listening to psychic forecasts is the *Sun*, which said its 2004 predictions were from "the world's most brilliant psychics and seers."

For example, Terry and Linda Jamison, who are twins, said, "Saddam Hussein will be killed by U.S. troops early in the year." They also predicted that "Pope John Paul II will pass away in June."

Anthony Carr, billed as "the world's most documented psychic," had some well-documented failures. He said nuclear weapons would accidentally detonate in North Korea and kill thousands, Saddam would be shot to death and that a woman "will be involved," and scientists would "successfully bring the first-ever male pregnancy to term." He even predicted the baby's gender: a boy.

Other Carr predictions were about as firm as the filling in a Boston cream pie. Carr said Osama bin Laden would be brought to New York, but he couldn't decide if the terrorist would be alive or dead. He said the Martha Stewart trial "could" send the domestic diva to prison. And he said the Hollywood area "is due" for "a colossal earthquake early in 2004." If Tinseltown had been destroyed, he would certainly take credit for the forecast. But although it hasn't, nobody can technically say he was wrong, said Emery.

Colin Powell showed up in a couple of other forecasts. Carr said Powell would accept the nomination for president after twice refusing it. "Psychic" Martha Henstridge said Powell would change political parties and "trounce" Bush in the November election. Henstridge also said 2004 would be the year an antigravity engine was developed and patented, and although she didn't say whether Martha Stewart would be found guilty or innocent, she did inform us that Stewart "will take the fashion world by storm with a new line of prison-themed designer clothing."

Henstridge and other psychics have already made forecasts for 2005 in the *Sun*. But this year, the tabloid has made sure they won't be embarrassed by any inaccurate forecasts, said Emery.

Not only are the psychics' names not attached to any of the predictions, but their forecasts have been mixed in with predictions from dead people like Edgar Cayce, Nostradamus, and Our Lady of Fatima.

"So a year from now," said Emery, "we won't be able to say who was responsible for predicting that a murder will take place on a shuttle flight to Mars, Osama Bin Laden will be crushed by a comet, a tidal wave will wipe out Tokyo and the Korean peninsula, and newly discovered writings from St. Paul will reveal that eating with a fork is a sin."

Blundered Predictions in 2004: A Sylvia Browne Review

Sylvia Browne is one of the best-known alleged psychics in the world and has

been popularized mostly by television talk-show hosts Larry King and Montel Williams. She has repeatedly avoided taking the Million Dollar Paranormal Challenge—offered by the James Randi Educational Foundation—even though she agreed to do so three times on live television.

This is a review of her predictions for 2004, made on *The Montel Williams Show*, which aired December 31, 2003. Not surprisingly, many of the predictions were vague and difficult to measure. For example, she predicted that California Governor Arnold Schwarzenegger will "come to the forefront" (whatever that means). Others were obvious, such as her prediction that the cruise industry would see a boom in business. Because of the September 11, 2001 terrorist attacks, an expected decline in cruises was seen due to ships becoming likely terrorist targets—in other words, there was nowhere for the industry to go but up. Below is a partial list of Browne's blunders from the December 2003 *Montel*:

- *American troops will be pulled out of Iraq by June or July.*
- *Osama bin Laden is "dead as a doornail."*
- *Britney Spears and Justin Timberlake will not marry.* She is actually correct on this one, but by the time the show aired, ABCnews.com had already reported that they were broken up.
- *Julia Roberts's marriage would end.* Not only is Roberts still married to cinematographer Danny Moder—whom she wed in July 2002—but she gave birth to twins on November 28, 2004. Moder is the father.
- *Britney Spears doesn't find anyone.* Spears got married to childhood friend Jason Allen Alexander in Las Vegas on January 3, 2004—*just three days after the prediction aired.* The marriage was annulled the next day, but I'm not inclined to negate the prediction because of this.
- *Martha Stewart will not go to jail.* Stewart reported to a federal prison in West Virginia on October 8, 2004.
- *North Korea will launch nuclear weapons in 2004.* Not as far as we know.
- *The Pope will die.* As 2005 began, Pope John Paul II was alive. But at the Pope's age, I don't think Browne went out on a limb for this one—he was born on May 18, 1920.

Browne has a master's degree in English literature. Perhaps she should consider utilizing this degree rather than to purport to have psychic ability. Do you think any talk shows will air her 2004 blunders?

—Bryan Farha

Bryan Farha is a professor of Behavioral Studies in Education at Oklahoma City University and is a CSICOP scientific and technical consultant.

Holy Grilled Cheese?

A Hollywood, Florida, couple, Gregg and Diana Duyser, received $28,000 when they auctioned a reputedly ten-year-old grilled cheese sandwich bearing what they perceived was an image of the Virgin Mary.

The sandwich image thus joined in the notoriety accorded such other sacred food icons as Maria Rubio's famous 1977 tortilla, bearing the face of Jesus in the pattern of skillet burns; a giant forkful of spaghetti pictured on a billboard in which some could see the image of Christ; and the likeness of Mother Teresa discovered on a cinnamon bun at a coffee shop. (See Joe Nickell, "Rorschach Icons," *SI* 28:6 [November/December], 15–19.)

The Internet auction site eBay had initially pulled the item—which supposedly broke its policy of not allowing "Listings that are intended as jokes." The Duysers insisted the item was neither a hoax nor a joke and soon the "Virgin Mary sandwich" (as cnn.com dubbed it) was back, attracting bids. The sandwich was purchased by an online casino (GoldenPalace.com) whose CEO said he intended to use it to raise funds for charity.

Duyser, fifty-two, said that after she had grilled the sandwich and taken a bite, she suddenly noticed, looking back at her, a woman's face that had formed in the toasting pattern. She placed the sandwich, which she stated had been made without butter or oil, in a plastic box along with cotton balls. It remained on her night stand for a decade.

The $28,000 miracle grilled cheese sandwich.

Duyser was impressed that the sandwich never molded. However, if toast and hardened cheese were kept dry, they should actually resist molding.

As to the image, as CSICOP told the Associated Press, it is nothing more than the human ability called *pareidolia* to interpret essentially random patterns as recognizable images—such as seeing the face of the Man in the Moon. Such pictures are called *simulacra*, many of which are interpreted as religious images (a female face becoming "Mary," for instance). These are perhaps most often associated with Catholic or Orthodox traditions, wherein there is a special emphasis on icons or other holy images. (See Carolyn Thompson [AP], "Expert explains grilled cheese 'miracle,'" newsday.com, November 17, 2004.)

—Joe Nickell

Joe Nickell is CSICOP's Senior Research Fellow and author of Looking for a Miracle.

New Future Fund

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UPDATE

HEADQUARTERS EXPANSION AMHERST, N.Y.

2005

The Center for Inquiry – *Transnational* announces a major 13,600 square foot expansion at its Amherst, New York, headquarters. Slated for completion during 2005, the $2.54 million expansion will more than double conference and seminar capacity, add ten urgently-needed new offices, and enlarge the Center's world-class libraries. This capital project will relieve serious overcrowding and capacity problems, supporting projected program growth of the Center and its affiliate organizations, including the Committee for the Scientific Investigation of Claims of the Paranormal, for years to come.

We are bursting at the seams, and cannot continue program growth without expanding our headquarters. The shelf space of our skeptical and freethought library—the finest in the world—is full. Yet donated books, magazines, and archival materials keep coming. There's an office or workstation everywhere we can put one, yet program and staffing needs continue to grow. Our existing conference and seminar space, opened in 1995, is often overwhelmed by larger and more complex events.

The headquarters expansion is one focus of our $26.26 million New Future Fund capital campaign. Your gift to the New Future Fund today will help to make our desperately-needed headquarters expansion a reality. We seek gifts of cash, publicly-traded securities, paid-up insurance policies, and other assets. Attractive incentive and naming opportunities are offered in acknowledgment of larger gifts. All gifts are fully tax-deductible as provided by law. Please join us and declare your support. Write, call, email, or send the bound-in postcard today!

The new addition will be erected just east of the present building, constructed in 1995.

Three large seminar rooms open off of the new building's central corridor.

Center for Inquiry–*West*, Los Angeles

Center for Inquiry–*MetroNY*, at Rockefeller Center

Center for Inquiry–*Florida*, Tampa

Located between the current and new buildings, this Garden Patio will be an exciting focus for seminar meal breaks, media interviews, and other outdoor activities.

Contact: Development Department,
Center for Inquiry – *Transnational* • PO Box 741, Amherst NY 14226-0741
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NMSR's Best and Worst of 2004 Awards

It's time once again for the New Mexicans for Science and Reason's Annual Awards. Here we go!

• The "Traveling Scientists" Award go to Spirit and Opportunity, the NASA rovers that have been doing splendid Martian geology for most of 2004, and are still going.

• The "Not the E-Word!" Award goes to Kathy Cox, Georgia State Schools Superintendent, who said she removed references to evolution from the proposed biology curriculum because it is "a buzzword that causes a lot of negative reaction." She was forced to recant.

• The "Amen, Brother Jimmy!" Award goes to President Jimmy Carter, who said he was "embarrassed by Superintendent Kathy Cox's attempt to censor and distort the education of Georgia's students . . . there can be no incompatibility between Christian faith and proven facts concerning geology, biology, and astronomy. There is no need to teach that stars can fall out of the sky and land on a flat earth in order to defend our religious faith."

• The "Right On!" Award goes to Darby, Montana High School students, a third of whom protested the school board's decisions to question evolution, carrying signs like one which read: "Creationism in a cheap tuxedo." The board action was later withdrawn.

• The "House of Cards" Award goes to the Columbia University authors of an Intercessory Prayer Study. The study was published three years ago in the *Journal of Reproductive Medicine*. One of the authors pled guilty in 2004 to fraud charges in Federal Court; a second claimed only to have provided editorial assistance; and a third isn't talking.

• The "ID is Content Free!" Award goes to Intelligent Design creationist William Dembski, who said in 2004 that ". . . intelligent design makes no claims about the origin or duration of the universe, is not committed to flood geology, can accommodate any degree of evolutionary change, does not prejudge how human beings arose and does not specify in advance how a designing intelligence brought the first organisms into being. . . ."

• The "Teach the Controversy (Unless It Bothers Creationists)" Award goes to ID creationist Phillip Johnson, who said in 2004 that "I have consistently said that I take no position on the age of the earth, and that I regard the issue as not ripe for debate yet. . . ."

• The "We Don't Need No Stinkin' Church-State Separation" Award goes to the *Washington Times* Foundation, which staged an elaborate "coronation" of Rev. Sun Myung Moon, who owns *The Washington Times*, as humanity's "savior, Messiah, Returning Lord and True Parent." The ceremony was held in the Senate's Dirksen Office Building, with several congressmen attending.

• The "Better Luck Next Time" Award goes to the New Mexico State Supreme Court, which renewed New Mexico's status as the only state allowing polygraphs in court, despite pleas from the state attorney general's office and others that polygraph tests were bad science and poor evidence.

• The "But You *Were* in the Federal Government" Award goes to New Mexico Governor Bill Richardson, who said "Clearly, it would help everyone if the U.S. government disclosed everything it knows" in the foreword to a new Sci Fi channel book about the recent Roswell UFO "dig." The *Albuquerque Tribune* got it right from SI editor Ken Frazier: "If he thinks the government is covering something up, why didn't he do something about it when he was in the federal government?"

• The "Honesty Is Its Own Reward" Award goes to NIDS, the National Institute for Discovery Science (Robert Bigelow's pro-UFO think tank in Nevada), which announced on October 15 that it was shutting down indefinitely because of steep declines in alien/UFO cases in recent years.

• The "At Least He Had a Beard" Award goes to Barnes and Noble, which published an autobiography of Charles Darwin in 2004 with a cover mistakenly bearing the image of the famous bearded British nineteenth-century naturalist Alfred Russel Wallace.

• The "Never a Dull Moment" Award goes to *Homo floresiensis*, the hobbit-sized hominids from just 18,000 years ago that surprised even the most jaded naturalists.

• The "Gotcha!" Award goes to Oded Golan, the Israeli collector who was the source of the supposed "James, brother of Jesus" ossuary. Golan has been charged with forgery.

• The "Boy Who Cried Over-Unity" Award goes to Dennis Lee, who has announced yet another demonstration of his supposed "free electricity" machines (a perpetual motion scam) for July 4, 2005. These demos have been promised for years and years, but have yet to happen. This year's new batch of suckers will probably see the light in a year or three, at least.

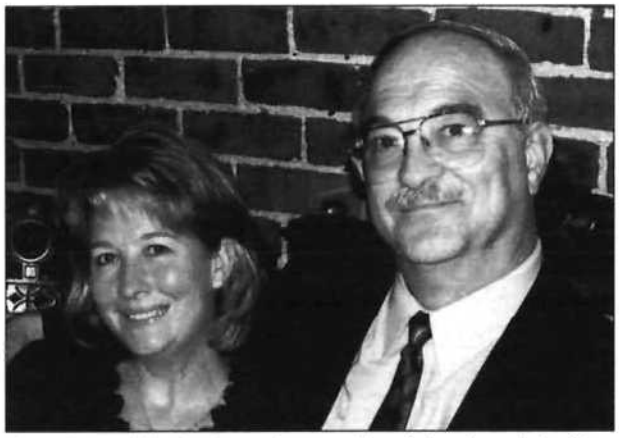
• The "Don't Stop Now—It's Getting Good" Award goes to the Theory of Evolution, which still struggles for popular acceptance while finding stupendous experimental support and utility in science. In 2004, the evolution of irreducibly complex features was documented for flagellum motors and colorful coral proteins; more transitions were found between fish and amphibians (nostrils and fins-to-legs), the handedness of primordial amino acids was better understood, a single gene was found to be capable of giving mice long, bat-like fingers (explaining rapid evolution of bats), the natural history of the uterus was developed, a gene common in Tibetans was found to improve oxygen intake, and a possible common ancestor of all the great apes, including humans, was found. Not a bad year, except for that "popularity" thing. *National Geographic* gets a commendation for helping in that regard.

—*David E. Thomas*

David E. Thomas is a New Mexico physicist and President of NMSR. □

Intuition: The Case of the Unknown Daughter

In the fall of 2003, my life was transformed by the news that I was the father of a beautiful, thirty-six-year-old daughter. She had confronted her mother on the basis of "intuition" that told her the man who helped raise her was not her actual father. Instead, as soon proved by DNA testing, we discovered that she was *my* child. As one who had long been skeptical of much that is labeled *intuition*, I had to admit that *something* had just happened—something both wonderful and mysterious. With the approval and assistance of my daughter, Cherette, I decided to investigate. As I learned, understanding intuition depends in part on how it is defined.



The author and his daughter, who sensed her father through intuition.

Sixth Sense?

To New Age writers like Patricia Einstein, author of *Intuition: The Path of Inner Wisdom* (2003), intuition is an "inner awareness" that functions as a "sixth sense"—that is, a form of extrasensory perception that includes psychometry (an alleged psychic skill in which information is gleaned about people, or even places or events, by touching objects that are associated with them).

Like other New Agers, she maintains that people have auras (or energy fields) that stem from a larger "universal energy flow" which the ancient Chinese termed *chi*. "Connecting with your intuition," she declares, "is the act of tuning in to the never-ending flow of universal energy." Intuition has frequencies, she explains, and so, "In a sense, tuning in to intuition is like tuning in to a radio station" (Einstein 2002, 1–2, 40–41, 105).

Actually, Patricia Einstein is no Einstein. Although she insists that "Instances of psychic healing and psychokinesis (telepathic movement of objects) have been well documented" (Einstein 2002, 37), she herself provides no documentation. In fact, such claims have been repeatedly discredited. For instance, many ballyhooed psychokinetic marvels have been exposed as the product of deceivers using magic tricks (Randi 1982; Korem 1988).

Much effort has been expended in the search for extrasensory phenomena, including the pioneering work of Britain's Society for Psychical Research (SPR), founded in 1882, and the scientific research of Dr. J.B. Rhine at Duke University in the 1930s. Rhine was a sincere and dedicated, but credulous, parapsychologist. His first published report on the subject, coauthored with his wife Louisa, was "An investigation of a 'Mind-Reading' Horse," appearing in 1929. They believed the mare, Lady Wonder, was telepathic. However, magician and paranormal investigator Milbourne Christopher (1970, 39–54) visited Lady undercover and determined that she simply responded to subtle cues used by her owner to relay information that had been gleaned from the subjects.

Rhine's later card tests engendered considerable controversy, but proof of ESP did not materialize (Christopher 1970, 19–37). Despite the work of others who have followed in Rhine's footsteps, ESP remains unproved, and its existence has not been accepted by mainstream science. (See for example, Kurtz 1985; Hansel 1989; Stenger 1990.)

Nevertheless, the belief that intuition is a psychic process persists. It ranges from the relatively harmless, such as

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New Age shops touting gemstones like hematite and tiger's eye as having the power to enhance intuition, to the dangerous, such as "medical intuitives" who claim to diagnose illness by reading a person's aura (Nickell 2001).

Dual Processing

But if intuition is not a sixth sense, what is it? Does it exist at all? Do people merely make guesses, then count the hits and disregard the misses? Certainly, our hunches are not always accurate. Elizabeth Loftus, past president of the American Psychological Society, cautions: "Intuition is hot. But often it is perilously wrong." She recommends the book *Intuition* by David Myers who, she states, "marshals classic and contemporary science and masterfully shows us why." And skeptic Michael Shermer wrote for the *Los Angeles Times* Book Review, "Myers' book brilliantly establishes intuition as a legitimate subject of scientific inquiry."

As Myers relates, many studies show that quick, impressionistic judgements—while often mistaken—can nevertheless predict some behaviors more successfully than rationally analyzed ones. Myers (2002, 4) observes that we have two quite different ways of knowing things. He explains:

> . . . [R]ecent cognitive science reveals a fascinating unconscious mind—another mind backstage—that Freud never told us about. More than we realized over a decade ago, thinking occurs not on stage, but off stage, out of sight. . . . [S]tudies of "automatic priming," "implicit memory," "heuristics," "spontaneous trait inference," right-brain processing, instant emotions, nonverbal communication, and creativity unveil our intuitive capacities. Thinking, memory, and attitudes all operate on two levels (conscious and deliberate, and unconscious and automatic)—dual processing, today's researchers call it. We know more than we know we know.

As noted psychologist Robert A. Baker told me—with specific reference to my daughter's intuitive revelation—we humans are constantly responding to subtle cues. Unconsciously, we collect and assemble bits of data—much like pieces of a jigsaw puzzle—often arriving at the realization of some larger concept. No single piece of information may be sufficient, but, taken together, the clues may produce something greater than the sum of its parts.

In using intuition, because we are not *consciously* (i.e., deliberately and analytically) processing data, the result can be quite startling—bordering on revelation and seeming quite mysterious. When my daughter's mother, Diana, asked her why she thought her father was not really hers, she replied, "I don't know. It just came into my mind."

Identifying the Clues

In the case of my daughter's intuition, I sought to identify the clues that might have led to her sense of "knowing" that she had a different father.

Diana describes her in growing up, as not having much of a "whimsical mode," but instead being typically serious and inquisitive. Among the things she wondered about were her eyes, which matched neither her father's nor her mother's. (See photo. They resemble my ancestors' even more than mine.) Although many people remarked that she and her sister did not look like sisters, she knew she resembled her mother and did not become suspicious of her parentage—at least not consciously. Nevertheless, her younger brother was adopted, so at some point the idea that she could have been adopted too would have presented itself. (In fact, her sister once thought all three were adopted.)

There were other clues. At Cherette's wedding, when she was twenty-six, a friend of her mother's inadvertently revealed a family secret: that her parents had not been married when she was conceived. Again, that bit of information was not in itself very revealing, but it can now be seen as potentially suggestive, another piece of the puzzle.

Following some medical tests, in March 2001, she announced to her mother that she had learned her blood type. Although she did not then ask her parents' blood type—so she did not yet know hers was different from each of theirs and incompatible with her father's—nevertheless the announcement may have put a thoughtful expression on her mother's face that Cherette then read, unconsciously. At least it subtly presented, however obliquely, the issue of genetics.

In June 2003, while she was talking on the phone with her mother, the fact that she was conceived before her parents were married again came up. She said she did not care about that, so long as her father was indeed her father. Her mother assured her that that was so and that he had raised her. In a way that would be appreciated by fortunetellers using "cold reading" (an artful method of fishing for information), Cherette thought she detected some possible equivocation and challenged: "What else haven't you told me?" and "Mom, who is my daddy?"

Soon, Diana conceded there was a chance it was someone else, but that there were only "two possibilities": If her father was not her actual father, she said, then it was a young poet she had been with for a short time before resuming her relationship with her old boyfriend, Cherette's supposed father. At this, Cherette says, she felt that she probably did have a different father, and by the time her mother had tracked me down both were convinced I was indeed Cherette's "Daddy" (as she now calls me)—a fact we confirmed by DNA testing.[1] (Not entirely lost on me during our Thanksgiving 2003 first meeting was the irony that as a paranormal investigator I was myself being investigated—the result of intuition, no less!)

Assessment

Although not arrived at consciously, nevertheless my daughter's sense that she might have had a different father could *logically* be inferred from the data: That her brother was adopted raised the question of her own parentage; since she resembled her mother but not her father, and especially since her eyes were not similar to either's, she could expect that she might have a different father; that possibility was enhanced by her parents not having been married when

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Do Extraordinary Claims Really Require Extraordinary Evidence?

Carl Sagan had a rare gift for making clear rather abstruse ideas. To the readers of SKEPTICAL INQUIRER, perhaps no example is more familiar than the succinct rendition of David Hume's treatment of miracles that Sagan popularized: "extraordinary claims require extraordinary evidence."[1] Hume wrote a highly controversial essay on miracles in 1748, and philosophers and theologians are still talking about it. The essay is important not only to skeptics but to scientists at large, because it lays out some important observations about the nature of evidence and how it relates to the acceptance of hypotheses.

A recent caustic critique of Hume's work has been published by John Earman (in a collection entitled *Bayes's Theorem*, edited by Christian theologian Richard Swinburne). In essence, Earman claims that Hume is vague about what he says, and that his arguments can be interpreted in a fashion that ranges from the trivial (one ought to be careful about accepting eyewitness testimony in the case of miracles) to the absurd (no testimony will ever be sufficient to establish a miracle). Earman couches his critique in terms of Bayes's theorem on conditional probability (see Thinking about Science, May/June 2004), claiming that Bayes's theorem can be interpreted as a devastating blow to Hume's "pompous" opinion on the matter.

I think Hume can be read precisely as proposing a rather sophisticated Bayesian account of miracles and the nature of evidence, and that there is nothing vague, trivial, or absurd in the Scottish philosopher's essay. Let us proceed first by quoting (as does Earman) Hume himself on the definition of miracles: "A miracle is a violation of the laws of nature," i.e., miracles are in Hume's view a wholly different matter from unusual or exceptional natural phenomena. The skeptical philosopher then goes on to say that "no testimony is sufficient to establish a miracle, unless the testimony be of such a kind, that its falsehood would be more miraculous than the fact which it endeavors to establish." This should make it clear that Hume is *not* saying that testimony could *never* establish the truth of a miracle, only that the standard of acceptance should be exceedingly high; as Sagan put it, given that we are trying to establish the truth of a very extraordinary claim, it stands to reason that we need an extraordinary degree of evidence to back up such a claim.

But what of highly unusual, naturalistic phenomena, such as some quantum events? Earman charges that when accepting Hume's dictum about miracles, one is then forced to either throw away a significant number of scientific findings or to adopt a double standard as far as evidence is concerned. I suggest that Hume's writing is consistent with the second option, and that, contrary to how it may appear at first glance, this is a very reasonable position indeed.

Earman himself points to the following excerpt from Hume's essay: "suppose all authors, in all languages, agree, that, from the first of January 1600, there was a total darkness over the whole earth for eight days. Suppose that the tradition of this extraordinary event is still strong and lively among the people: that all travelers, who return from foreign countries bring us accounts of the same tradition without the least variation or contradiction: it is evident, that our present philosophers, instead of doubting the fact, ought to receive it as certain. . . ." That is, testimony *can* be sufficient to establish the truth of a highly unlikely, even unique, event; no need to throw away quantum mechanics just because some of it deals with unusual occurrences.

What, then, is the difference between the case of a highly unusual, even never before observed, natural phenomenon and a miracle? Why do we need so

DO EXTRAORDINARY CLAIMS REALLY REQUIRE EXTRAORDINARY EVIDENCE?
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Massimo Pigliucci is a professor of evolutionary biology at SUNY–Stony Brook, a fellow of the American Association for the Advancement of Science, and author of Denying Evolution: Creationism, Scientism, and the Nature of Science. *His essays can be found at www.rationallyspeaking.org.*

Was a Quack Doctor Jack the Ripper?

In the never-ending search for the true identity of the elusive Jack the Ripper, a recent extraordinary discovery has attracted the attention of Ripperologists worldwide. It now seems not unlikely that the murderer may have been a suspect hitherto unknown to researchers: an Irish-American quack doctor named Francis J. Tumblety.

The story begins with the discovery of a very important document known as the "Littlechild letter." This letter, written by former Chief Inspector John G. Littlechild to the journalist George R. Sims in 1913, came to light in a small collection of Sims's correspondence that was bought in 1993 by Stewart Evans, a police officer himself and a leading authority on the Ripper case. Evans recognized its significance immediately. Littlechild, in fact, had been in charge of the Special Branch at Scotland Yard in 1888, the year in which the Ripper killed his victims, and in that capacity, would have worked in close and regular personal contact with men like Chief Inspector Swanson, appointed by Sir Charles Warren to oversee the Ripper inquiry.

The Disquieting Dr. T.

In his letter, Inspector Littlechild writes: "... amongst the suspects, and to my mind a very likely one, was a Dr. T. . . . He was an American quack named Tumblety and was at one time a frequent visitor to London and on these occasions constantly brought under the notice of police, there being a large dossier concerning him at Scotland Yard. Although a 'Sycopathia Sexualis' [*sic*] subject he was not known as a 'Sadist' (which the murderer unquestionably was) but his feelings toward women were remarkable and bitter in the extreme, a fact on record. Tumblety was arrested at the time of the murders in connection with unnatural offenses and charged at Marlborough Street, remanded on bail, jumped his bail, and got away to Boulogne, France. He shortly left Boulogne and was never heard of afterwards. It was believed he committed suicide but it is certain that at that time, the 'Ripper' murders came to an end."

Francis J. Tumblety was in fact in London during that fatal autumn of 1888 and on November 16 was brought before the Marlborough Street Police Court charged with homosexual offenses. He posted bail and was ordered to appear at the Central Criminal Court, but he violated bail, fled to France, and there, under the alias Frank Townsend, boarded a steamer bound for New York.

Tumblety was a well-known suspect in 1888, but somehow his existence was missed by researchers until the surfacing of this letter.

As with all of the suspects in the case, there is no concrete evidence pointing to Tumblety, but the plethora of circumstantial evidence, as well as the letter and opinion of such a high-

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ranking officer, makes Tumblety the most plausible new suspect.

Very little information has been ascertained about Tumblety's beginnings, and I will draw on the excellent work done at www.casebook.org (and based on Stewart Evans and Paul Gainey's *Jack the Ripper: First American Serial Killer*) to draw a profile of the suspect.

*His birthplace is the first of many mys*teries surrounding him. He was possibly a Canadian, the son of an emigrated Irishman, born around 1833, the youngest of eleven children. His family soon moved to Rochester, New York, where neighbors and acquaintances thought him "a dirty, awkward, ignorant, uncared-for, good-for-nothing boy . . . utterly devoid of education." He was also known to peddle pornographic literature on the canal boats of Rochester. At some point in his adolescence, he also began working at a small drugstore run by a Dr. Lispenard, who is said to have "carried on a medical business of a disreputable kind."

Around 1850, Tumblety left Rochester, perhaps for Detroit, where he started his own practice as an Indian herb doctor. He was arrested in 1857 for attempting to abort the pregnancy of a local prostitute. It was alleged that he sold her a bottle of pills and liquid for the purpose, but after some legal haggling, Tumblety was released.

Francis J. Tumblety, Jack the Ripper suspect.

Around 1860, he left Montreál for Saint John, Nova Scotia. In September of that year, he again found trouble when a patient of his named James Portmore died while taking medicine prescribed by Tumblety. In his typical brazen fashion, Tumblety showed up at the coroner's inquest and questioned Portmore's widow himself as to the cause of death. The ruse didn't work, however, and Tumblety made a last-ditch attempt at freedom by fleeing the town for Calais, Maine.

It was at this time that Tumblety's alleged hatred for women became most pronounced, as seen in the testimony of a Colonel Dunham, who was one night invited to dinner by Tumblety: "Someone asked why he had not invited some women to his dinner. His face instantly became as black as a thundercloud. He had a pack of cards in his hand, but he laid them down and said, almost savagely, 'No, Colonel, I don't know any such cattle, and if I did I would, as your friend, sooner give you a dose of quick poison than take you into such danger.' He then broke into a homily on the sin and folly of dissipation [promiscuity], fiercely denounced all women and especially fallen women.

"He then invited us into his office where he illustrated his lecture so to speak. One side of this room was entirely occupied with cases, outwardly resembling wardrobes. When the doors were opened quite a museum was revealed—tiers of shelves with glass jars and cases, some round and others square, filled with all sorts of anatomical specimens. The 'doctor' placed on a table a dozen or more jars containing, as he said, the matrices (uteri) of every class of women. Nearly a half of one of these cases was occupied exclusively with these specimens. . . . When he was asked why he hated women, he said that when quite a young man he fell desperately in love with a pretty girl, rather his senior, who *promised to reciprocate his affection.* After a brief courtship he married her. The honeymoon was not over when he noticed a disposition on the part of his wife to flirt with other men. He remonstrated, she kissed him, called him a dear jealous fool—and he believed her. Happening one day to pass in a cab through the worst part of the town he saw his wife and a man enter a gloomy-looking house. Then he learned that before her marriage his wife had been an inmate of that and many similar houses. Then he gave up all womankind."

If any of this account is to be taken at face value, it certainly contains various elements that may have contributed to the making of a murderer.

Pursued by Scotland Yard

After a series of brushes with the law (including his being arrested in connecting with the Lincoln assassination) Tumblety wisely decided to leave America for London in the late 1860s. In the years that followed, he continued to travel across both America and Europe, returned to Liverpool in June of 1888, and once again found himself at odds with the police. He was arrested on November 7, 1888, on charges of homosexual activities.

Most interestingly, Tumblety was then charged on suspicion of the Whitechapel murders on November 12, but as we have seen, he fled to France before a trial could be held. New York officials knew of his impending arrival and had the ports watched for the suspect but to no avail. It was reported that Scotland Yard men had followed Tumblety across the Atlantic,

and it is known that Inspector Andrews did follow a suspect to New York City around this time.

New York City's Chief Inspector Byrnes soon discovered that Tumblety was lodging at 79 East Tenth Street at the home of a Mrs. McNamara, and he had him under surveillance for some days following. Byrnes could not arrest Tumblety because, in his own words, "there is no proof of his complicity in the Whitechapel murders, and the crime for which he was under bond in London is not extraditable."

Fear and suspicion rose until, on December 5, Tumblety disappeared from his lodgings once again, eluding the New York City police, who were watching him closely. Interest gradually waned as the years dragged on, and Tumblety next appeared in Rochester in 1893, where he lived with his sister for a time. He died a decade later in 1903 in St. Louis as a man of considerable wealth and was buried in Rochester, New York.

Facts and Doubts

In conclusion, Evans and Gainey outline fifteen reasons why they believe Tumblety should be considered a top suspect in the Whitechapel murders. Among them:

- Tumblety fits many requirements of what we now know as the "serial-killer profile." He had a supposed hatred of women and prostitutes (based on the abortion with the prostitute, his alleged failed marriage to an ex-prostitute, his collection of uteri, etc.).
- Tumblety was in London at the time.
- Tumblety may have had some anatomical knowledge, as can be inferred from his collection of wombs, his "medical" practice, and his short-term work with Dr. Lispenard in Rochester.
- He was arrested in the midst of the Autumn of Terror on suspicion of having committed the murders.
- There were no more murders after he fled England on November 24.
- Chief Inspector Littlechild, a top name in Scotland Yard, believed him a "very likely suspect," and Littlechild was not alone in his convictions.

As convincing as all this appears, however, there are other historians who do not agree with these conclusions. First of all, although Tumblety's homosexuality could at that time be seen as a strong element of suspicion (Littlechild wrote in his letter: "It is very strange how those given to 'Contrary sexual instinct' and 'degenerates' are given to cruelty, even Wilde used to like to be punched about"), today things are seen differently. From what is known of serial killers today, Tumblety's tendencies might exclude him as a suspect; homosexual serial killers, in fact, are concerned singularly with male victims and would be uninterested in female prostitutes. And, according to as noted a Ripper authority as Philip Sugden, Tumblety was fifty-six years old in 1888, far older than any of the men reportedly seen in the company of the victims, and he also seems to have been a man of much greater physical stature than the Ripper. As for evidence, there was never anything of substance that could connect Tumblety with any of the murders.

So it may be that Tumblety had nothing to do with the killings in Whitechapel. Or he may very well have been the actual killer, and new evidence may surface in the future. In truth, however, we have to deal with the fact that after a century of final solutions, the answer to the killer's true identity may never come to light, and Jack the Ripper could forever remain a mystery.

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Announcing a new SKEPTICAL INQUIRER column: The Skeptical Inquiree

Since 1976, the SKEPTICAL INQUIRER has been a valuable resource for skeptics, journalists, and the general public, leading the examination of the paranormal and fringe science. One of the great things about the mandate of the Committee for the Scientific Investigation of Claims of the Paranormal is that it is so broad: hundreds of topics fall under our scrutiny, from ear candling to polygraphs, cold fusion to auras, lake monsters to hauntings. New subjects come up regularly, and old topics get revisited. The SKEPTICAL INQUIRER Online Index (www.csicop.org/si/index) is a great resource, but with so many topics, some will naturally get ignored. Thus we see a need for a reader-driven column in SKEPTICAL INQUIRER: answering readers' questions about fringe science and the paranormal.

So make your voice heard! Wondering whatever happened to red mercury or Uri Geller? Want to know why people see faces in clouds and cheese sandwiches? Ask the skeptic! Submissions can be sent to: The Skeptical Inquiree, SKEPTICAL INQUIRER magazine, P.O. Box 703, Amherst NY 14226 (or bradford@centerforinquiry.net). Not all queries can be answered, and submissions may be edited for clarity and length.

One Longsome Argument

By any objective measure, the evolution of species ranks among the most successful scientific theories ever. So why is the message not getting through?

DENNIS R. TRUMBLE

Charles Darwin liked to describe the origin of species as "one long argument," but his extensive treatise in support of biological evolution now seems painfully brief compared to the argument that has followed in its wake. Indeed, never in the history of science has a more prolonged and passionate debate dogged the heels of a theory so thoroughly researched and repeatedly validated. And the end is nowhere in sight. Despite all evidence to the contrary, a large portion of the world's population continues to cling to the belief that human beings are fundamentally different from all other life forms and that our origins are unique. It's a lovely sentiment to be sure, but how is it that so many people continue to be drawn to this thoroughly discredited notion?

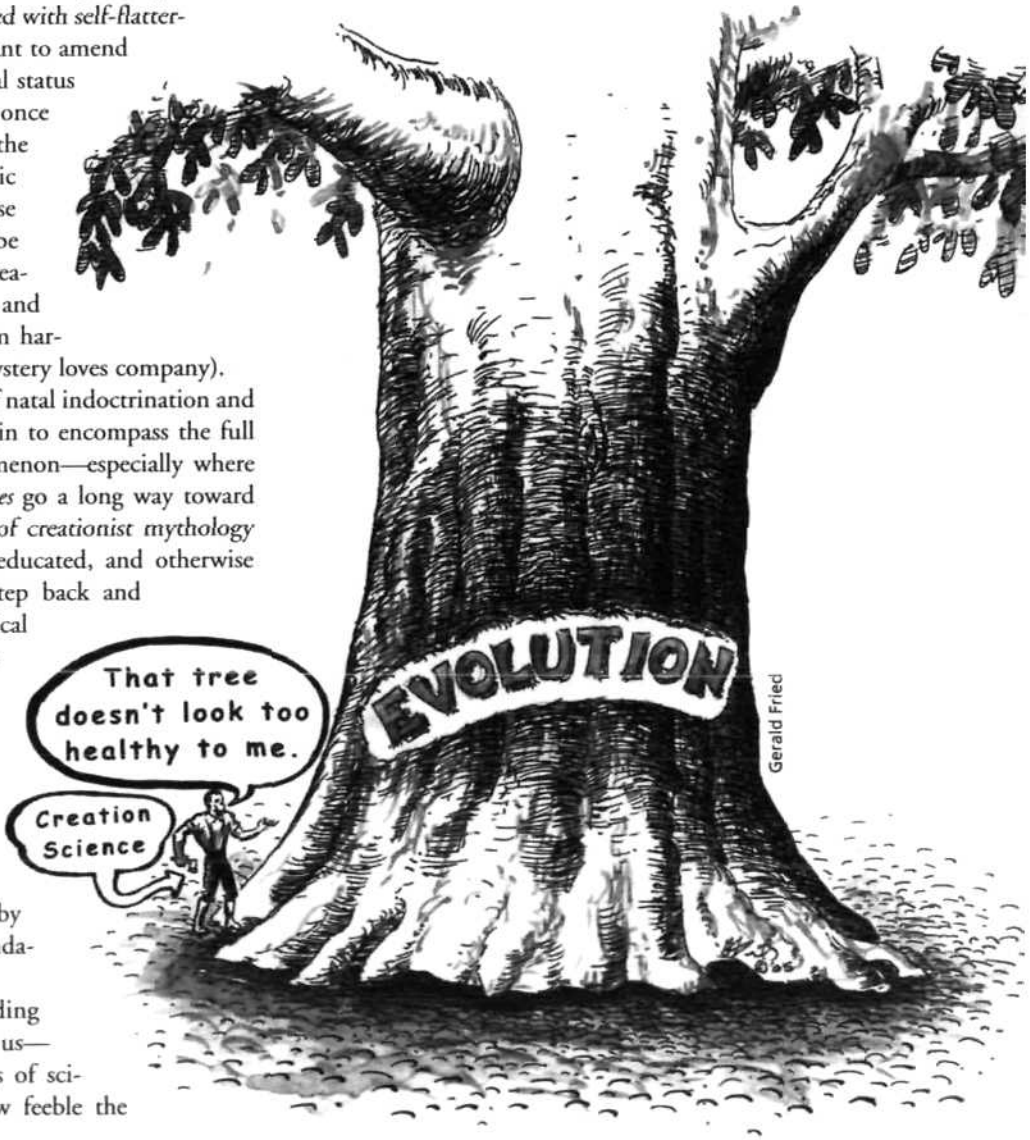
Like most mystic mindsets, creationist beliefs are normally instilled at an early age, nurtured by well-meaning parents and sustained by religious organizations whose vested leaders are traditionally loath to amend church doctrine in the face of emergent scientific facts. Though seemingly antithetic to the inquisitive nature of our species, the rote acceptance of received wisdom has been a hallmark of human culture almost from the get-go, arising initially as a benign behavioral adaptation geared to promote the rapid transfer of communal survival skills to our young hominid forebears. It was only with the advent of modern civilization that this age-old habit finally began to outlive its usefulness and yield serious negative consequences—most notably by granting gratuitous momentum to all kinds of ill-conceived notions about how the world is "supposed" to work. Today, this surge of ideological inertia remains a surprisingly powerful force, pushing beliefs as impossibly anachronistic as geocentrism and flat-Earth cosmology past the ramparts of the enlightenment to foul the fringes of modern thought.

Fortunately, unlike the veiled forces that impart momentum to particles of mass, the impulse that propels incongruous ideas from one generation to the next is fairly transparent at its base. After all, youngsters imprinted with self-flattering beliefs are understandably reluctant to amend them later in life owing to the special status and privileges they bestow. And once someone has grown accustomed to the hollow pleasures of this egocentric world view, it's easy to see how these inflated beliefs would come to be shielded from the prickly barbs of reason by a panoply of family, friends and other like-minded folks, all of whom harbor the same inscrutable notions (mystery loves company).

Although this perpetual pattern of natal indoctrination and communal reassurance does not begin to encompass the full psychosocial breadth of this phenomenon—especially where adult converts are concerned—it *does* go a long way toward explaining the inordinate longevity of creationist mythology and why so many intelligent, well-educated, and otherwise rational people appear unable to step back and examine certain beliefs with a critical eye. Because creationist beliefs are both deeply rooted and profoundly comforting, it isn't hard to understand why certain people feel compelled to enlist any and all means at their disposal to discredit Darwin's theory. Nor is it difficult to imagine the sense of frustration they must feel when repeatedly told by scientists that their arguments are fundamentally flawed.

Problem is, most folks—including many of the more learned among us—don't understand the basic workings of science well enough to appreciate how feeble the arguments against evolution really are. If they did, they would realize that the scientific process is not about gathering data to prove a favored hypothesis but instead involves the testing of ideas against the totality of real-world observations. Creationists turned amateur scientists almost always fail to grasp this essential scientific precept and so unwittingly launch from false premises all kinds of pseudoscientific arguments in support of special creation. In fact, if there's one reason why creationist critiques are so consistently misguided it's that adherents generally presuppose that special creation is true and then sift the evidence for clues to support that supposition—a recipe for self-deception that stands in stark contrast to the scientific method, which mandates that fresh hypotheses be derived from *all* available evidence.

Were this fundamental misconception to be extinguished in a sudden wave of scientific literacy, the illusory evidence that thinking creationists use to anchor their beliefs would be swept away in an instant, leaving precious little demand for the writings of creation "scientists." As it is, however, an ungodly amount of literature is being published by the sectarian faithful



in a spirited attempt to preserve mankind's privileged place in the grand scheme of things. Whether knowingly or not, creationists of every stripe have come to rely on an assortment of pseudoscientific arguments to legitimize their efforts to unravel the fabric of evolutionary theory, hoping against hope that the extensive tapestry woven by seven generations of scientists might somehow dissolve with the tug of a few loose threads. Unfortunately, as the weave of evolutionary theory has continued to tighten and expand, the number and variety of confused arguments in defense of creationism and intelligent design have only risen to keep pace.

One popular approach enlisted by creation "scientists" is the classic all-or-nothing argument wherein proponents claim that nothing in science can be known with confidence until every last detail is described with absolute certainty. Appealing largely to those unschooled in the scientific method, critics point to such nonissues as gaps in the fossil record, poorly understood aspects of gene function, and the mystery of life's origins as reasons to view evolutionary theory as speculative or provisional. What they fail to appreciate is that scientific theories are built solely upon evidence that is actually available for study and so cannot be refuted by speculation regarding those clues that remain hidden. As long as a theory remains consistent with observed phenomena and yields valid predictions, it must be considered a viable explanation regardless of what remains to be discovered. Thus, it is entirely irrelevant that gaps in the fossil record exist, but vitally important that those fossils that *do* exist make sense in the context of evolution. A single hominid fossil found among the trilobites of the Burgess Shale, for instance, would immediately throw Darwin's theory into doubt. Likewise, the fact that certain aspects of molecular genetics remain to be fully described in no way negates the fact that the substantial amount that *is* known about gene function is entirely consistent with evolution as we understand it today.

Yet despite the proverbial admonition against doing so, many still view the absence of evidence as evidence of absence and remain all too eager to fill this fictional void with the narrative of their choosing. Indeed, this particular brand of *argumentum ad ignorantiam* has long been a mainstay for creationists looking to wedge their cosmology between the narrowing gaps of scientific knowledge (an increasingly difficult task). But issues of legitimacy aside, because this fallacy has sired so many specious claims over the years it seems only fitting that the mother of all such "arguments to ignorance" should stem from the granddaddy of all biological data gaps: the evolution of single-celled life forms.

Because no physical body of evidence exists to document the beginning of life on Earth, this information gap has proven to be a wildly popular (albeit wholly inappropriate) foil for those seeking to discredit evolutionary theory. In truth, the origin of life is an issue entirely separate from the origin of species, rendering this otherwise important question utterly irrelevant as far as the veracity of natural selection is concerned. Whether the first primitive life form arose from known physical processes or was somehow willed into being through means beyond our understanding, evidence that all life on Earth descended from simple primordial beings remains just as compelling, and the myth of independent creation just as untenable.

But even this slender refuge for creationist sentiment has now begun to evaporate under the light of modern scientific scrutiny, for although Earth's original life forms left no physical evidence for scientists to examine, credible hypotheses regarding the spontaneous formation and assembly of self-replicating molecules have been proposed and tested nonetheless. Laboratory experiments and astronomic observations suggest that key organic compounds were present in abundance shortly following Earth's formation and that natural chemical affinities and mineral scaffolds may have acted in concert to produce the simplest of biochemical copying machines. In 1953, Stanley Miller became the first to demonstrate that amino acids and other organic molecules could have formed through chemical means in prebiotic oceans capped with an atmosphere of ammonia, methane, and hydrogen gas. Although geochemists now question Miller's assumptions regarding the reducing power of the prebiotic atmosphere (Bada 2003), reducing environments may well have existed in isolated pockets on the embryotic Earth (near volcanic vents for instance). Moreover, many of these same organic compounds have been found to exist among interstellar dust clouds and meteorites, suggesting that life's building blocks may have been delivered to Earth on the backs of icy comets and carbonaceous asteroids.

Based on these and other findings, biochemists have proposed several plausible mechanisms by which these compounds may have coalesced of their own accord into the precursors of life. Experiments confirm that layered mineral deposits can attract, concentrate, and link organic molecules and that certain clays may function as scaffolding for assembling the molecular components of RNA (Hazen 2001). Crystalline templates have also been proposed as possible means of primitive protein assembly, their mirror-image surface structure accounting for the curious predominance of "left-handed" amino acids found in all creatures living today. These and other minerals have also been shown to facilitate the sequence of chemical transformations needed to spark life, acting as sheltered containers (feldspar), catalysts (magnetite), and iron sulfide reactants (pyrite). What's more, a complex mixture of organic compounds formed within simulated interstellar ices has recently been observed to spontaneously form cell-like vessels when immersed in water (Dworkin 2001), providing yet another viable mechanism by which particles awash in a dilute prebiotic soup might have assembled themselves into crude cells.

Although the precise sequence of events will never be known with absolute certainty, these and similar experiments

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strongly suggest that the earliest terrestrial life forms arose spontaneously and in accordance with the known laws of nature. In short, everything we have come to understand about our world suggests that living creatures are a natural consequence of the laws that govern the physical universe—no more anomalous than the matter they comprise or the space they occupy. Yet despite all efforts to disseminate this hard-earned knowledge, a broad swath of creationist sentiment lingers on, fueled by well-worn arguments ranging from the philosophical and dogmatic to the confused and plain disingenuous. The great majority of these objections, however, quickly collapse under even the most cursory examination.

Many of the "scientific" arguments for intelligent design, for instance, invoke common misconceptions about how the physical world really works, as in the classic "watchmaker" argument wherein nature is assumed to act randomly and possess no organizational tendencies. Given this false premise, it is a simple matter to show that complex molecular structures could never have formed by chance alone any more than a factory whirlwind could assemble a Mercedes Benz from its component parts. But anyone with a basic understanding of chemistry knows full well that such analogies do not apply to atoms and molecules. If the physical sciences have taught us nothing else, it's that the world of the very small is surprisingly counterintuitive. Processes in the realm of the microscopic simply do not behave as one might expect based on our experience living on the macroscopic plane. Electric charges, energy barriers, and nuclear forces all dominate the realm of the minuscule and compel individual atoms to form stable chemical bonds with neighboring elements, blindly building molecular structures of every possible type and complexity that the laws of physical chemistry will allow.

Objects large enough to arouse our naked senses, on the other hand, behave quite differently. Because they exhibit no special affinity for one another, the scattered components of a disassembled watch will never coalesce of their own accord—the odds against such haphazard assemblies are simply too long. Nature, however, does not act without organizational tendencies nor are living organisms randomly assembled. There is now ample reason to believe that simple unicellular life forms arose through processes endemic to the life-friendly universe we occupy and that more sophisticated beings slowly emerged from these modest beginnings. Indeed, all complex organisms on Earth (including humans) begin life as single cells that multiply, differentiate, and ultimately mature to assume the form of its parent—all in strict accordance with the natural laws of biochemistry.

The contention that evolution somehow violates the second law of thermodynamics is another popular fiction that has endured through widespread confusion over a fundamental physical concept—in this case, thermodynamic entropy. Couched in the plainest possible terms, the second law simply states that energy tends to spread from areas where it is concentrated to areas where it is not. Although it is not widely recognized, this phenomenon is an integral part of our everyday experience and shapes our commonsense expectations. Because energy always flows from where it is concentrated to where it is more diffuse, we expect, say, a warm bottle of Gewürztraminer to chill when lowered into a bucket of ice water. In this instance, thermal energy will flow from the tepid wine to the surrounding fluid until both reach a common temperature and an energetic balance is achieved. Like the ice bucket and its contents, self-contained systems receiving no external energy will always experience a net increase in the diffusion of thermal energy, or a rise in thermodynamic entropy, resulting in lower energy gradients and less potential to do work.

The contention that evolution somehow violates the second law of thermodynamics is another popular fiction that has endured through widespread confusion over a fundamental physical concept—in this case, thermodynamic entropy.

Regrettably, this same term has also come to be used in a statistical context involving the distribution of particles placed in random motion within a closed system—a situation that has bred a great deal of confusion. Unlike thermodynamic entropy, which defines energy distributions, "logical" entropy describes the probability that randomly distributed particles will assume a certain configuration or organized pattern. Ordered systems with low entropy values may appear to the casual observer to contain discernable patterns whereas high entropy systems seem more disorganized. Gas molecules distributed within an enclosure, for example, are said to exhibit greater entropy when they are scattered than when they are grouped together. Why? Because although every possible pattern of molecules has an equal chance of occurring, there are a great many more ways to define a diffuse pattern than any given clumped arrangement and, as physicist Richard Feynman was keen to observe, logical entropy is simply "the logarithm of that number of ways."

Despite the fact that thermodynamic and logical entropy are wholly independent concepts, many laymen—and a few scientists who really should know better—have nonetheless come to confuse and intermingle the two, transforming the second law of thermodynamics into a fictitious "law of disorder" that ostensibly explains why all material things decay and fall apart. In truth this has nothing to do with the second law of thermodynamics and even misuses the concept of logical entropy in

that it attempts to explain large-scale phenomena. There is, in fact, no such universal mandate of decay that precludes the spontaneous formation of complex assemblages. Just because all complex systems will eventually break down as energy throughout the cosmos becomes evenly distributed doesn't mean that some interesting patterns can't take shape in the meantime.

Those who argue this point from a purely energetic standpoint are somewhat less confused but just as easily refuted. The fact that the amount of energy available to do work must always decrease in a closed system would indeed be a serious impediment to the evolution of life if our planet were isolated from all external energy sources, but one need look no further than our companion star to see that such is not the case. Energy is constantly being delivered to the thin shell of our biosphere both from above, in the form of sunlight, and below, via heat generated by Earth's radioactive core, providing ample energy to fuel the assembly of structured molecules. Moreover, while it is true that the overall entropy of an isolated system cannot decrease, the entropy of certain *parts* of a system can, and often do, spontaneously decrease at the expense of even greater increases in adjacent regions, as with the formation of crystalline salts and snowflakes. Besides that, millions of chemical compounds including water, cholesterol, and DNA actually carry *less* energy than the elements they contain (possessing "negative energies of formation" in scientific parlance). In these cases, the second law of thermodynamics actually *favors* the impromptu formation of complex structured molecules due to their tendency to disperse energy as they coalesce.

Another threadbare canard spread by the creationist camp is that biological evolution is still not widely accepted within the scientific community—a ruse for which competing evolutionary hypotheses are offered up as evidence. The truth of the matter is quite the opposite. The fact that biologists support alternate hypotheses regarding specific evolutionary mechanisms no more challenges the reality of evolution than Einstein's relativistic views threatened the existence of gravity. Whether evolution proceeds in fits and starts as envisioned by the punctuated equilibrium model or progresses with more stately regularity, each competing hypothesis simply seeks to explain a certain aspect of evolution in a plausible way. The overarching framework of evolution itself, however, remains astonishingly consistent with the huge body of evidence accumulated to date. Far from being the object of scientific debate, the evolution of species is actually no more, and no less, than the collection of observed facts that these hypotheses are meant to explain. Gene flow, frequency dependence, and punctuated equilibrium are but three possible mechanisms put forward to explain the nature of this overarching phenomenon. Which, if any, of these hypotheses survive the test of time bears no influence on whether modern species are the product of biological evolution—the evidence in this regard, now comprising countless independent observations, is simply overwhelming. It is only the processes that drive the phenomenon of evolution that remain the object of scientific scrutiny.

Unencumbered by the rules of scientific inquiry, others proclaim with total aplomb that evolution can never be truly validated until major speciation events (the transformation of land mammals into whales for instance) are observed directly. In this case, what is ignored is the important fact that reliable scientific evidence is not limited to firsthand experience of real-time events but includes all forms of physical clues. The folly of this argument becomes evident when one considers that knowledge of galaxy formation, stellar composition, and subatomic particles would be impossible if researchers were to adopt similar rules of evidence across the whole of science. But why stop at the boundaries of academia? Imagine for a moment the chaos that would ensue within the criminal justice system if such an unreasonable burden of proof were placed on prosecutors! Indeed, as many jurors would no doubt attest, it is often the physical evidence that proves most compelling in a court of law, eclipsing even eyewitness accounts that can be tainted by errors of interpretation or outright deceit.

Beliefs maintained through the narrow interpretation of isolated facts or held in default against evidence not readily understood can be called any number of things, but "scientific" is certainly not one of them. As these few examples illustrate, the myriad approaches adopted by creation "scientists" in their attempts to undermine evolutionary theory are indeed quite creative but hardly scientific. As has been demonstrated time and again, evidence carefully sifted can be enlisted to endorse practically any supposition so long as the preponderance of contrary clues are ignored and the rules of sound scientific practice are suspended. It is precisely this brand of exclusionary thinking that enables young-Earth devotees to dismiss mountains of physical evidence while defending their assertions with such flawed assumptions as constant population growth and the linear decay of Earth's magnetic field (both demonstrably false). Likewise, partisans who claim that evolutionary processes have never actually been observed inexplicably dismiss the scientific literature where such observations have been reported in abundance. In truth, physical adaptations to environmental pressures have been documented in *hundreds* of modern species from bacteria and fruit flies to birds, squirrels, and stickleback fish (Pennisi 2000). Even Darwin's own finches have been caught in the act of adaptation thanks to decades of meticulous study spearheaded by Princeton biologists Peter and Rosemary Grant.

A full accounting of the ways in which the scientific method has been manipulated to promote creationist sentiment would doubtless occupy many volumes, but in no instance has a legitimate scientific case ever been made to countermand the notion that, as Darwin phrased it: "from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved."

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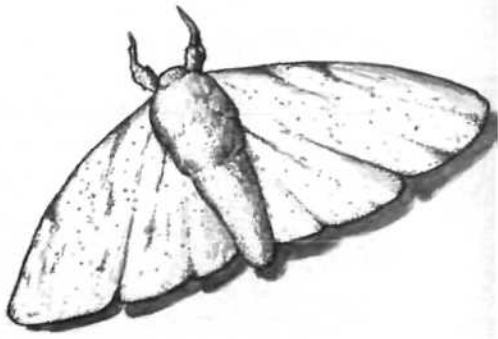


Moonshine
Why the Peppered Moth Remains an Icon of Evolution

The peppered moth evolved a dark form in response to soot covering its habitat during the industrial revolution. Or did it? There has been speculation that the data were faked or manipulated. An investigation shows that this criticism is without foundation.

MATT YOUNG and IAN MUSGRAVE

Bernard Kettlewell did not cheat—or, more precisely, the evidence does not support the insinuation, widely repeated on the Internet, that he cheated.

Kettlewell was a distinguished naturalist whose studies on predation in peppered moths were a landmark in demonstrating natural selection in the wild. His studies are widely quoted and often used in textbook accounts of natural selection. The journalist Judith Hooper (2002) strongly suggests, however, that Kettlewell fraudulently altered the results of his famous studies, and others have uncritically accepted her suggestion. Reviews of Hooper's book in the scientific literature are at best mixed (Coyne 2002, Grant 2002, Shapiro 2002), and experts on moth behavior remain convinced that

Figure 1. The pale or light-colored form (top) and the dark or melanic form (bottom) of the peppered moth *Biston betularia*. The wings span 4–5 cm. Photo by Bruce S. Grant, *Journal of Heredity*, vol. 93, March–April 2002 (cover). Copyright ©2002 by the American Genetic Association, reprinted with permission.

the story of the peppered moth is sound (Cook 2000, 2003; Grant 1999; Majerus 1998, 2002; Mallet 2004). More pertinently, *Kettlewell's data are completely consistent with normal experimental variation, and Hooper's insinuations are groundless.*

Kettlewell's Experiments

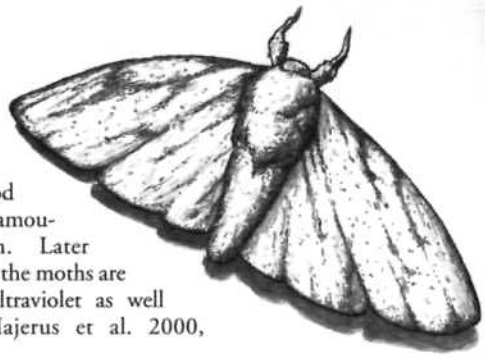
What did Kettlewell do, and why does Hooper think he fudged his data? Beginning in the mid-1800s, successive generations of peppered moths (*Biston betularia*) in Britain gradually darkened in response to the air pollution in the industrialized parts of the country (figure 1). Specifically, a genetically determined dark, or melanic, form of the moth replaced the lighter form as industrial pollution killed lichens on the bark of trees and also coated the bark with a layer of soot. The effect has come to be known as *industrial melanism*, and its existence is not in dispute (see Forrest and Gross 2004, 107–111 for a review).

Kettlewell (1955, 1956, 1959) showed that the melanic form of the moth predominated primarily because of predation by birds. He did not think that predation was the only cause of industrial melanism and in fact speculated as to the relative strengths of other causes. Briefly, he performed a number of experiments (Kettlewell 1959, Grant 1999, Musgrave 2005):

1. *Release-recapture experiments.* Kettlewell marked and released both light-colored and melanic moths early in the morning, and recaptured some the next night in both pheromone and light traps (using mercury-vapor lamps). In polluted woods, he and his assistants recaptured more melanic moths than light-colored (1955, 1956), whereas in unpolluted woods they recaptured more light-colored than melanic (1956).

2. *Direct observation* (1955, 1956) *and filming* (1956). Kettlewell and others observed birds eating moths directly off trunks of trees.

3. *Camouflage.* Kettlewell visually ranked the effectiveness of camouflage of moths on different backgrounds and compared the effectiveness of camouflage with predation rates both in an aviary and in the field. He did not know that birds had ultraviolet vision, which his observers lacked, but nevertheless got a good correlation between camouflage and predation. Later research has shown that the moths are camouflaged in the ultraviolet as well as in the visible (Majerus et al. 2000, Musgrave 2005).



4. *Geographical distribution.* He noted that the distribution of the melanic moths in the country closely matched the areas of industrialization (Bishop and Cook 1975).

We will discuss only the release-recapture experiments reported in Kettlewell's 1955 article, because these are the experiments that are under fire and because (unlike Kettlewell's critics) we can bring quantitative tools to bear on the analysis. For a more general analysis, see Bruce Grant's "Fine Tuning the Peppered Moth" in *Evolution* 53 (1999): 980–984 and Ian Musgrave's "Paint It Black: The Peppered Moth Story" in *Icons of Evolution*, which will be published by the Education Committee of the Society for the Study of Evolution in 2005.

Day	Date*	Number released	Number recaptured
0	June 25	32	–
1	June 26	0	5
2	June 27	59	2
3	June 28	63	4
4	June 29	0	9
5	June 30	102	2
6	July 1	114	23
7	July 2	98	34
8	July 3	83	29
9	July 4	79	25
10	July 5	0	16
	Totals	**630**	**149**

*Recaptures reported as June 26 took place between the evening of June 25 and the morning of June 26, and so on.

Table 1. Kettlewell's 1955 release-and-recapture data.

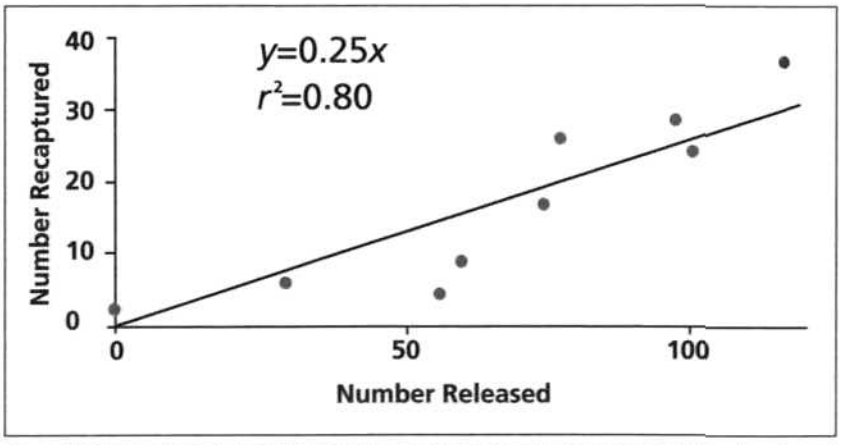


Figure 2. The number of moths Kettlewell recaptured as a function of the number he released the previous night. The relationship is linear with high correlation.

Kettlewell reported releasing and recapturing moths during an eleven-day period in 1953. His data are reproduced in table 1 (1955, 332). The numbering of the days is ours.

Hooper has noted that the number of recaptures increased sharply on July 1, the same day that Kettlewell's mentor, E. B. Ford, sent him an encouraging letter. Ford's letter commiserated with Kettlewell for the low recapture rates but suggested that the data would be worthwhile anyway. The letter is unremarkable, and two facts militate against a finding of fraud. First, Kettlewell finished collecting data in the wee hours of the morning and therefore could not have received the letter before collecting his data on July 1. Second, he markedly increased the number of moths he released on June 30, the day before the letter was mailed, not July 1. Additionally, as Hooper admits, he continued to release a high number of moths after June 30. Not surprisingly, he also recaptured more moths: more moths released, more recaptured.

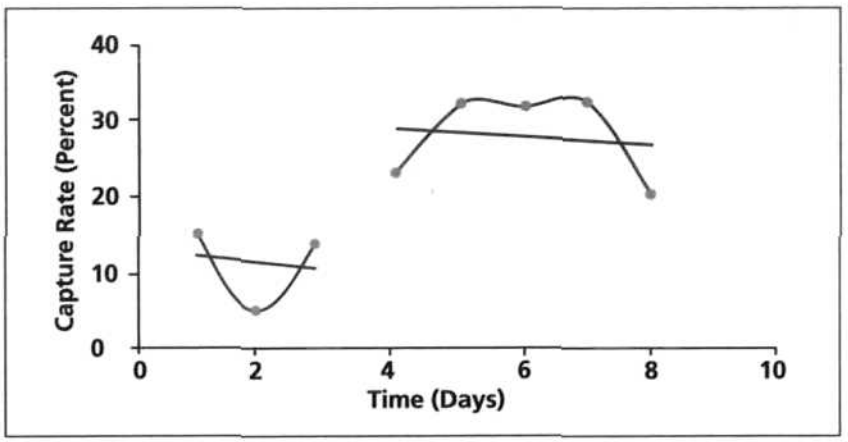
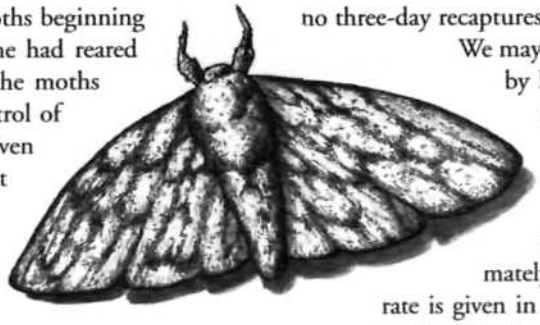


Figure 3. Kettlewell's recapture rate as a function of time, ignoring the two days following zero releases. Note that, owing to the vagaries of graphing programs, the days are not numbered correctly.

Indeed, figure 2 plots recapture rate as a function of the number of moths released on any day. The line is a line of best fit constrained to pass through the origin on the assumption that no moths are recaptured if none are released. Figure 2 shows that the recapture rate is very nearly a linear function of the number released. The square, r^2, of the correlation coefficient is 0.80 and suggests that most of the variation of the number of recaptures is accounted for by variation of the number of releases. The fit improves only slightly if the line is not constrained.

Why did Kettlewell release more moths beginning on June 30? He released both moths he had reared and moths he had captured. Because the moths were just hatching, he had limited control of the number he could release on any given day. There is no reason to suspect that the increased numbers of releases reflect anything other than the number of moths that were available. At any rate, Ford's letter could not have influenced his decision to release more moths because it arrived after Kettlewell's first big release on June 30.



Still, his recapture rate, as well as the absolute number of moths recaptured, increased from 12 percent over the first three days of his experiment to 26 percent over the last three days. More pointedly, if we plot his recapture rate as a function of time, as in figure 3, we find what looks to the eye as a sudden increase.

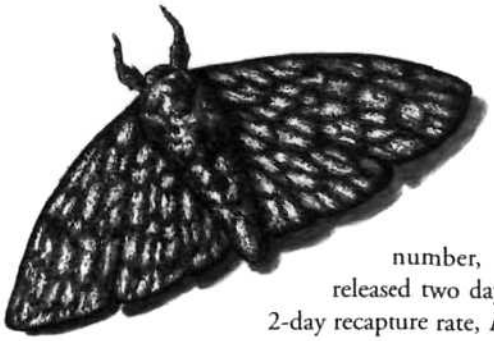
Figure 3 omits those days, June 27 and June 30, that were preceded by zero releases. It is hard to make much out of a mere eight data points, but the recapture rate certainly appears to the casual observer to increase sharply after one day of inactivity. Biological field data, however, display significant random variation, and the eye often infers patterns in random data, so we performed a quantitative analysis to see whether Kettlewell's data are what we would expect given normal experimental variations. Specifically, we constructed a mathematical model to see how well it describes Kettlewell's data.

Mathematical Model

Kettlewell recaptured most of his moths after they had been in the wild for only one day, but he recaptured some after two days. Let us therefore define a one-day recapture rate, R_1, and a two-day recapture rate, R_2, as the fractions of moths recaptured after one and two days in the wild. Kettlewell reported no three-day recaptures.

We may estimate the two-day recapture rate by looking at the four moths captured on days 2 and 5. No moths were released on the preceding days, but two days before, a total of 63+32=95 moths had been released, so R_2=4/95, or approximately 4 percent. The overall recapture rate is given in table 1 in the row labeled "Totals" and is R=149/630, or approximately 24 percent. The one-day recapture rate is the difference ($R_1=R-R_2$) between the two values, or about 19 percent (the numbers do not add exactly because of round-off error). R_2 is very nearly equal to the square of R_1, as we would expect if the model is appropriate.

Our mathematical model is straightforward: The number, $N_{c,i}$, of moths recaptured on the ith night is equal to the number, N_{i-1}, of moths released the day before times the one-day recapture rate, R_1, plus a similar term, the



number, N_{t-2}, of moths released two days before times the 2-day recapture rate, R_2. Specifically,

$$N_{n,t}=R_1N_{t-1}+R_2N_{t-2} \qquad (1)$$

The results of a calculation based on this model are shown as the solid curve in figure 4. Note that we have made no artificial assumptions, such as adjusting the recapture rates to get a good fit to the data, in constructing figure 4.

The points in figure 4 are Kettlewell's data, and the solid curve is the model. How well does the model fit the data? To answer that question, we have to estimate the normal range of variability in the data. To do so, we calculate the *standard uncertainty* of the data points. The standard uncertainty is a number that tells us, in this case, how much variation we might expect if we repeated the experiment many times.

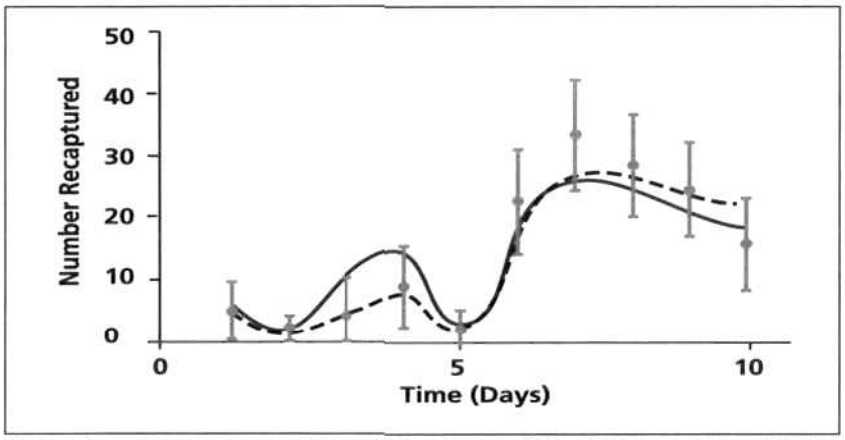


Figure 4. A mathematical model fitted to Kettlewell's data. The symbols are the data points, the solid curve is the model, and the error bars are the 95 percent confidence intervals. The dashed curve is the model corrected for exposure to moonlight.

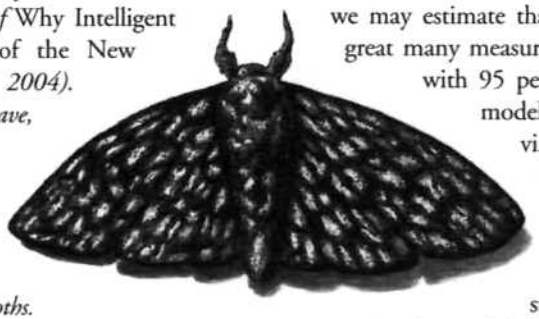
By way of introduction, suppose that you toss N marbles at a hole in a table. Count the number of marbles that fall through the hole, and repeat the experiment many times. Suppose that the average number of marbles that fall through the hole is M. You will not count M marbles every time you perform the experiment; to the contrary, the number will vary about M and very possibly will never exactly equal M. Thus, we talk of the probability p that any one marble passes through the hole and set it equal to the ratio M/N. The mean number of marbles that pass through the hole is equal to Np.

How much will any one toss differ from M? The number of marbles that pass through the hole is described by a binomial distribution. The standard deviation of M is therefore $\sigma=\sqrt{Np(1-p)}$. On approximately nineteen tosses in twenty, you will record a number that is between $M-2\sigma$ and $M+2\sigma$, so 2σ is most commonly used as a measure of uncertainty.

The uncertainty 2σ can be surprisingly large. For example, if p is 0.24 (the average recapture rate in Kettlewell's experiment) and N is 102 (the number of moths Kettlewell released on June 30), then M is 24 and 2σ is about eight. You can expect anywhere between sixteen and thirty-two marbles to fall through the hole on any given toss of 102 marbles. You should not be especially surprised by any number unless it is much less than twelve or much more than thirty-six. Thus, the day-to-day variation in an experiment such as Kettlewell's can easily be 100 percent or more. This fact alone should militate strongly against a charge of fraud.

On any given day, Kettlewell released N moths and recaptured M moths. Because the two-day recapture rate is small, the statistics are essentially the same as those of the marble example. The number M is highly variable, as we have seen; on another day, he might capture a substantially different number, even if conditions were unchanged. The standard uncertainty u estimates the probable variation of M quantitatively (ISO 1993). It is given by $u=\sqrt{NR(1-R)}$, where the recapture rate, R, replaces the probability, p. We apply this formula to each data point, using the overall recapture rate, R, for most days but the two-day recapture rate, R_2, for the two days that were preceded by zero releases.

The result is shown in figure 4 as a series of error bars. The error bars represent $\pm 2u$, an interval called the 95 percent confidence interval. If we take a single measurement, then we may estimate that the true value (the average of a great many measurements) falls within the error bars, with 95 percent probability. Inasmuch as the model (the solid curve) passes through virtually every error bar, it may be said to be a nearly perfect fit to the data, however poor it might appear in the absence of error bars. In addition, we will use another statistical technique to show below that the models fit the data well.



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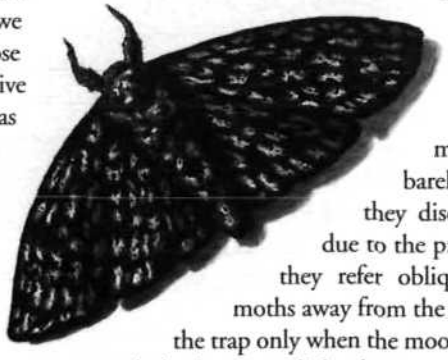
The points on days 7, 8, and 9 lie noticeably above the curve. If the data were completely unbiased, then we would expect about a 50-50 chance that any one of those points lay above the curve. The odds that three consecutive points lie above the curve are 1 in 8—exactly the same as the odds against tossing three heads in a row and by no means improbable enough to base a charge of cheating. Even if five points lay above the curve, the odds against would be 1 in 32, again, not very impressive in its improbability. Additionally, two consecutive data points lie noticeably below the curve.

In summary, the last five of Kettlewell's data points are higher than the first five. This meager fact, combined with the anecdotal evidence of Ford's letter, is all that led Hooper (2002) to infer that Kettlewell cheated. In reality, the timing of Ford's letter belies Hooper's inference, and Kettlewell's data are completely consistent with normal experimental variation.



Moonlight

The differences between the data and the curve are not significant; the observed variation very probably is the result of chance. It is, however, possible that the some of the deviation from the curve is "real"—that is, due to some systematic effect, or systematic error, not due solely to random error. It is very hard, unfortunately, to track down a source of systematic error when that error is itself less than the standard uncertainty of the data set; the systematic error is said to be lost in the noise.

Hooper tells us that the weather was stable and could not have accounted for the increase in the recapture rate (though her description suggests somewhat variable winds). We have, nevertheless, a strong candidate that can account for the systematic deviations of our simple model from the curve: the phase of the moon. Shapiro (2002), in his review of Hooper's book, suggests that moonlight interferes with moth trapping, a possibility that Hooper and her informant, biologist Ted Sargent, should have investigated. The moon was full on June 27 (that is, the night of June 26–27). By July 2, the moon was five days past full but visible for only part of the night. Thus, the total exposure to the moon—the product of illuminance (brightness) and time—was approximately one-quarter what it was during the full moon, and it dropped steadily over the next few days.

Clarke and his colleagues (1990) have investigated the effect of the phase of the moon on capture rates of peppered moths in light traps in a single environment over thirty years and concluded that the moon does not affect capture rates. Unfortunately, theirs was a retrospective study, and they did not record weather data—that is, did not control for cloudy or rainy days. They averaged the data over five-day periods surrounding the full moon and did not use the actual exposure to the moonlight (as defined above). All of these factors will reduce the correlation between capture rates and exposure to moonlight. Even so, they calculated a small but not statistically significant correlation that suggests a slight *increase* of capture rate around the full moon. In addition, when they checked the new moon against the full moon, they calculated a small, barely significant increase, which they discounted. Possibly the effect is due to the presence of streetlights, to which they refer obliquely, and which may attract moths away from the stronger mercury vapor light of the trap only when the moon is dark. At any rate, they conclude that moonlight does not affect capture rates. Kettlewell worked on clear days only; we do not think that the conclusion of Clarke and colleagues is necessarily pertinent.

Thus, we examined Kettlewell's data in hope of quantifying the effect of the moon on his recapture rates (1955, 332, table 5). We obtained data that gave the moon's magnitude (an astronomical term related to its brightness) and the duration during which the moon was visible each night during Kettlewell's experiment. We plotted Kettlewell's daily recapture rate as a function of the exposure to the moon (the product of brightness and time). We made no effort to control for the elevation of the moon. The result is shown in figure 5, which plots Kettlewell's daily recapture rate as a function of lunar exposure normalized to the value 1 on the night of the full moon. The equation in figure 5 is the equation of the line of best fit to the data. The daily recapture rate rises by a factor of 3 as the brightness of the moon decreases. (We could perform a similar calculation using Kettlewell's total captures [1955: 333, table 6], but such a calculation is complicated by the fact that the moths emerge from their cocoons haphazardly, whereas the recapture rate is based on a known distribution of released moths. Still, the calculation based on total captures yields much the same result as that outlined below.)

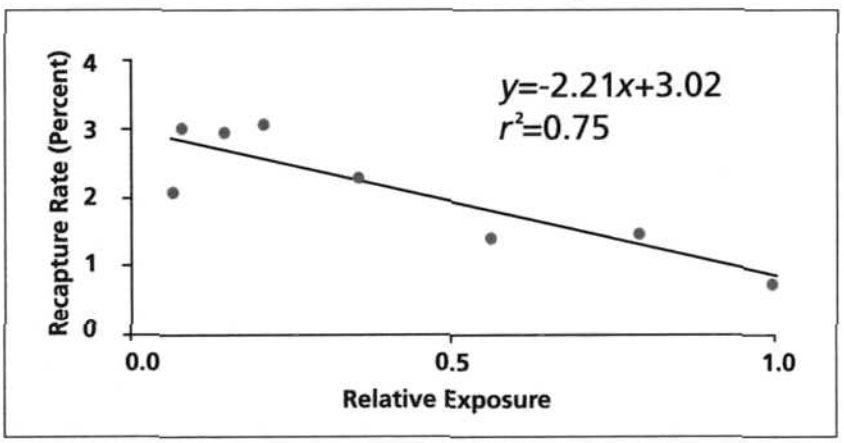
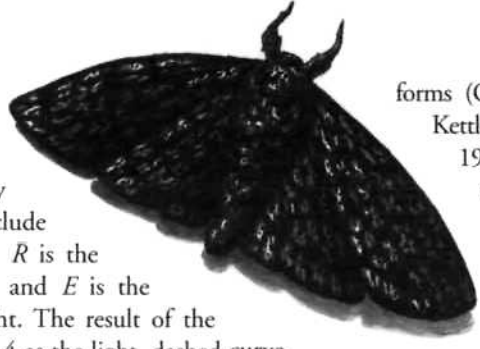


Figure 5. Kettlewell's daily recapture rate as a function of relative exposure to moonlight. The equation is a line of best fit that relates exposure to recapture rate.

Using the line in figure 5, we adjusted the calculated recapture rates according to the equation:

$$R' = R\,\frac{0.3017 - 0.2215E}{\bar{R}} \qquad (2)$$



where R represents the nightly recapture rate used in the model that led to figure 4, R' is the nightly recapture rate modified to include the effect of lunar exposure, R is the average daily recapture rate, and E is the nightly exposure to moonlight. The result of the calculation is shown in figure 4 as the light, dashed curve.

Hooper's claims are moonshine; they are based on a lack of understanding of Kettlewell's experiments in particular and experimental science in general.

It demonstrates a somewhat better fit to the data than the solid curve, especially during the first few days.

Finally, we used a goodness-of-fit test (a χ^2 [chi-squared] test with nine degrees of freedom [Feinstein 2002]) to compare the model's predictions with the observed data. Neither model was significantly different from the data; that is, the model fits the data very well. Specifically, the statistical significance, or P-value, was $P\approx0.17$ for the initial model and $P\approx0.75$ for the model corrected for moonlight. If the model and the data had been different, then P would have been 0.05 or less (that is, $P<0.05$ implies a statistically significant difference). The P-values therefore confirm what we already know from the uncertainty analysis.

Instead of asking why Kettlewell's recapture rate was high on July 1 and thereafter, Hooper should have asked why it was so low on June 30 and before.

Conclusion

Kettlewell's data are easily accounted for by the unsurprising fact that you can recapture more moths when you release more—that and normal experimental variation. When the effect of moonlight is included in the calculation, the calculated curve fits even closer to Kettlewell's data. We have no need of Hooper's perverse, *ad hoc* hypothesis of fraud.

Hooper's claims are moonshine; they are based on a lack of understanding of Kettlewell's experiments in particular and experimental science in general. Hooper evidently did not realize that the change in recapture numbers began before Kettlewell could have read the letter that supposedly triggered this change, let alone consider the most likely cause of the changes she saw, exposure to moonlight. Hooper and Sargent should have performed a careful analysis before Hooper's presumptuous insinuation of fraud.

Kettlewell's conclusion—that predation by birds was a major factor in promoting industrial melanism—was based on at least four lines of inquiry, as detailed above. It did not rely on the release-recapture experiments alone. It is also supported by at least thirty studies of different moth species that also developed melanic forms (Grant 1999), as well as independent replications of Kettlewell's landmark experiments (Grant 1999, Majerus 1998). In other words, an enormous body of evidence supports Kettlewell's conclusion. Even if Kettlewell's release-recapture experiments were ruled out, we would still be forced to conclude that industrial melanism is the result of natural selection due to bird predation, possibly among other causes.

Thus, there is no foundation for assuming that Kettlewell's data were manipulated. The variations in his data are no more than the uncertainties associated with sampling and other factors, possibly including exposure to the moon. It is an irresponsible leap to accuse a distinguished naturalist of fraud on the basis of a single letter and a wholly imperfect, offhand analysis of his data. The peppered moth properly remains a valid paradigm—no, an icon—of evolution.

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Acknowledgements

Matt Young is indebted to Pete Dunkelberg and Bruce Grant for helping him understand the uncertainties of field work in biology. Laurence Cook and Nicholas Matzke reviewed the paper and made many helpful suggestions regarding both clarity and content.

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Hyperbole in Media Reports on Asteroids and Impacts

News releases and media reporting on asteroid impact-related science frequently exaggerate the uniqueness and significance of new research. We should be skeptical of all claims of scientific revolutions.

DAVID MORRISON

Many observers of the science press have noted an increasing tendency for both news releases and printed stories to exaggerate the uniqueness and significance of new research. The writer of a news release does this to increase the probability that the media will cover the story, and the media reporter will go along with this hyperbole or perhaps expand it further to get the story approved for publication by editors or other gatekeepers.

The field of impacts (and impact hazards) is not immune to these trends. In my NASA-supported Web page http://impact.arc.nasa.gov, I try to apply a filter to reduce the noise level in media reports, which would otherwise overwhelm much of the real science.

This is not intended as a general criticism of science reporting. There are many excellent science journalists who understand the issues and provide well-reasoned discussions of context for news stories. Overall, the reporting by science journalists of impact-related stories has been excellent. But a hyperbolic headline added without their knowledge can sometimes catch even the best writers.

Background on Asteroids and Impacts

In his excellent book *Mysteries of Terra Firma* (Free Press, 2001), geologist James Powell discusses three revolutions in our understanding of Earth history. The first, responding primarily to the discovery of radioactivity at the end of the nineteenth century, was the concept of *deep time*—measurement of the age of Earth and dating of the primary geological and evolutionary events in its history. The second revolution dealt with the discovery of plate tectonics, first suggested (as "continental drift") but subsequently rejected early in the twentieth century. Plate tectonics was accepted only in the 1960s (when a wide range of strong new evidence was obtained) and has become the fundamental theory for understanding the dynamics and history of the Earth's crust. The third revolution was the space-age recognition of the role of cosmic impacts on geology and evolution.

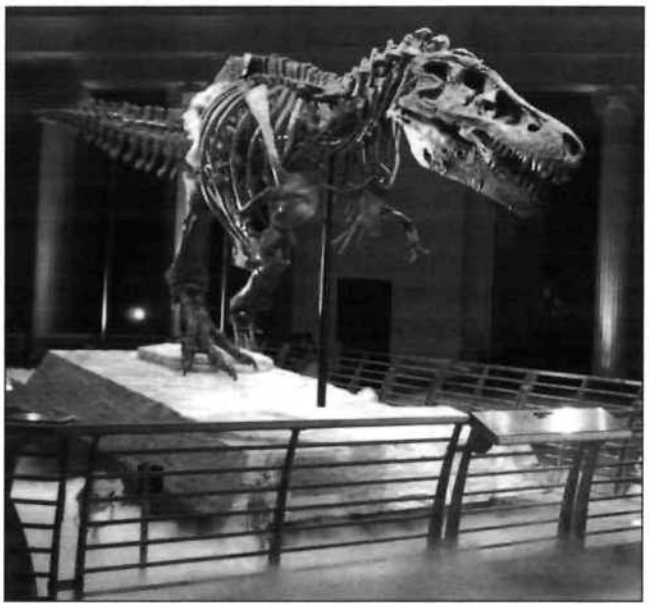
Scientists are still exploring many implications of this third revolution. Space exploration missions to other worlds and careful scrutiny of impact landforms on Earth have revealed that cratering is a universal process in the solar system. The pioneering work by Walter Alvarez and colleagues on the end-Cretaceous mass extinction further showed that cosmic impacts can have profound influences on the evolution of life. Whether other mass extinctions are also due to impacts remains an open question.

My own interest in impacts includes the contemporary danger from asteroids colliding with Earth. Although the probabilities are low, a devastating impact capable of killing hundreds of millions of people could happen at any time. The NASA Spaceguard program, which seeks to find any threatening asteroid in time to mitigate the impact (preferably by deflecting the asteroid away from Earth), is one response to a growing awareness of the impact problem.

Did the KT Impact Cause the Extinction of the Dinosaurs?

The KT (Cretaceous/Tertiary, 65 million years ago) extinction is by now an old story, but sometimes the news media still report dramatically opposed conclusions as if a major debate existed to this day. Certainly the issue was contentious when

David Morrison, a CSICOP Fellow, is the Senior Scientist at the NASA Astrobiology Institute. His primary interests are the new multidisciplinary science of astrobiology, the protection of Earth from asteroid impacts, and science outreach and education. He recently received the Carl Sagan Medal from the American Astronomical Society for his contributions to explaining science to the public.



impact extinction was first proposed by the Alvarez team twenty-five years ago, but a scientific consensus had emerged by the early 1990s. This progress of the Alvarez theory, increasingly supported by new evidence (such as the discovery of the Chicxulub Crater in Mexico), has been chronicled in several excellent books, such as *Night Comes to the Cretaceous* by James Powell, *T. Rex and the Crater of Doom* by Walter Alvarez, *The End of the Dinosaurs* by Charles Frankel, and *When Life Nearly Died* by Michael Benton.

In spite of the scientific consensus, there was substantial media coverage in 2004 of alternative hypotheses of dinosaur extinction. Major stories have arisen from the work of paleontologist Gerta Keller at Princeton, who has been challenging the impact theory for more than two decades. Recently she has decided that impacts may indeed be implicated, but probably not the Chicxulub impact (just off the coast of the Yucatan peninsula, the impact most earth scientists think is primarily responsible). One hypothesis she has suggested is that while the 100-million-megaton energy Chicxulub impact was insufficient to kill the dinosaurs, a smaller impact 300,000 years later may have done so. Princeton University frequently issues news releases on her work, and sometimes the publicity gets out of hand, with bold headlines such as "KT Mass Extinction Debate Wide Open and in Full Swing," "The Space Rock Was Framed: Asteroid Cleared in Dinosaurs' Death," and "Asteroid Couldn't Have Wiped Out Dinos."

One characteristic of media hype is to suggest that all science dealing with the KT extinction is about dinosaurs. Dinosaurs are popular. But dinosaur fossils, which are relatively rare, do not define the mass extinction boundary, which is precisely marked in the marine fossil record by changes in single-celled protists, as well as by the global layer of extraterrestrial material and shocked quartz from the impact.

On the other hand, some scientists discuss the dinosaur extinction without reference to the simultaneous global mass extinction in which more than half of all biological families were lost. This attitude is reflected in the remark by paleontologist

David Penny that "We agree completely with the geophysicists that an extraterrestrial impact marks the end of the Cretaceous. But after twenty-five years [scientists] have still not provided a single piece of evidence that this was the primary reason for the decline of the dinosaurs."[1]

Most scientists consider it to be exceedingly unlikely that the dinosaur extinction was unrelated to the global KT event. In addition to the coincidence in time and increasing evidence that the dinosaur extinction was abrupt, we think we understand how the Chicxulub impact killed large land animals by a combination of brief global firestorm followed by months of cold. Neglecting this relationship is one fatal flaw in this year's widely reported hypothesis that dinosaurs went extinct because of disparity in the numbers of males and females born. Perhaps in this case the publicity was stimulated by the word *sex*, as in the *Washington Times* headline "Why Dinosaurs Died—It's All about Sex."

An Impact-caused Extinction 250 Million Years Ago?

Was the end-Permian mass extinction caused by an impact? No one knows, even though the PT event (Permian/Triassic, 252.6 million years ago, a newly published, more precise date for the prime extinction) was the greatest of all mass extinctions, with more than 90 percent of families becoming extinct. The past year has seen several new scientific results, many associated with claims and counterclaims concerning the submarine Bedout impact (or non-impact) structure that might (or might not) be the "smoking gun" crater. Also widely reported have been evidence of extraterrestrial material (but not iridium or shocked quartz, so far) at the PT boundary, and recent indications that the PT extinction may have been two sharp events separated by several million years.

I have no quarrel with the media coverage of these issues, except where news releases claim that the question has been definitively solved. There is no consensus concerning the cause of the PT extinction, and hence every reason to follow the debates as they happen. For example, I will be interested in results from a blind test for evidence of an impact that is being conducted by a team of scientists using new samples from China, where an excellent cross-section of PT rocks is accessible.

Meteorites and Fires

Meteorites do not cause fires. Yet it is common to find news reports that a bright meteor fell and started a fire. Often the existence of a fire is quoted as evidence that the meteor struck the ground (thus making it a meteorite).

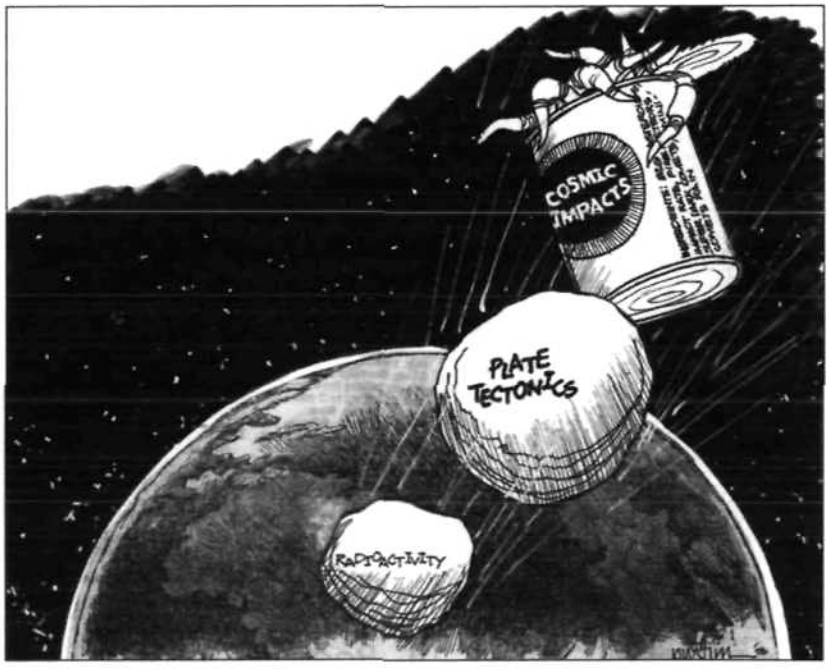
In 2003, the old idea that both the Great Chicago Fire of 1871 and another conflagration more than a hundred miles north in Wisconsin were started by hot stones falling from the sky was revived. This coincidence seems striking, with two of the most destructive fires in U.S. history happening at the same time—but the coincidence might also be related to extreme dryness and high winds across the upper Midwest.

In the cases where we have been able to estimate the surface temperature of just-fallen meteorites (such as where they land on snow or ice), the data indicate that they are cool. Nor should this be surprising: the violent heating of the stone's surface by atmospheric friction lasts only a few seconds, followed by several minutes of free-fall through the cold stratosphere. I follow the rule of thumb that if a meteor or meteorite is reported to have started a fire, the claim is probably mistaken. These are "meteorwrongs," not meteorites.

Meteorites do not cause fires. Yet it is common to find news reports that a bright meteor fell and started a fire. Often the existence of a fire is quoted as evidence that the meteor struck the ground.

The Recent Impact Rate

A common assertion in the tabloid press and on some Web sites is that we are at great risk from impacts, because impacts happen much more frequently than the scientists claim. Usually the argument is related to supposed evidence for recent large impacts.



One report (from *The Guardian*, on August 19, 2004) concerned huge craters under the Antarctic ice sheet said to be caused by an asteroid as big as the one that wiped out the dinosaurs, but striking about 780,000 years ago. The newspaper reported that an asteroid measuring three to seven miles across broke up in the atmosphere with five large pieces creating multiple craters over an area measuring 1,300 by 2,400 miles. Supposedly this impact caused a reversal in Earth's magnetic field (a highly suspect claim) but little other damage. Obviously the description of this event is inconsistent with what is known about cosmic impacts, yet this "discovery" was reported seriously.

In spite of the excellent reputation of their advocate and invocation of NASA satellite data, an intense rain of such mini-comets was quickly recognized by most scientists as inconsistent with a wide range of other observations.

The "Sirente crater," a lake near Abruzzi, Italy, has also been widely speculated to be an impact from the Roman period. If this were true, Sirente would be one of the most recent craters on Earth, falling right next door to the capital of the Roman Empire. However, no meteoritic material has yet been recovered from the lake. In 2004, an article in *Tumbling Stone* magazine suggests that this is an anthropogenic feature and not the result of an impact.

The Web site of *Astronomy* magazine published a report in October 2004 on identification of a field of meteorites and impact craters near Lake Chiemsee in southeastern Bavaria, Germany. This crater field, which falls within an ellipse 58 by 27 km, is said to hold at least eighty-one impact craters ranging from 3 to 370 meters in size. The authors, using historical and archeological evidence, conclude that an asteroid or comet fragment exploded above southeastern Germany in the Celtic-Roman period, probably around 200 B.C. They estimate that the projectile had a diameter of about 1 km. Since the authors are primarily amateur scientists and their work has not been published in a refereed journal, it is difficult for me to judge these conclusions, in terms of either the identification of impact craters or their probable date of formation. Another report, discussed below, suggests that there are many very dark, unseen comets that constitute a previously unrecognized threat.

In assessing the reliability of such stories, we should note that even one of these recent mega-impacts is unexpected from known impact rates, which are based on both astronomical observations and the long-term cratering history of Earth and Moon. (These impact rates might be off by a factor of two, but certainly not by a factor of ten or more.) For example, the Lake Chiemsee impactor is claimed to have been about 1 km in diameter and to have struck within the past 2,500 years, whereas on average an asteroid or comet this large hits Earth only once in about 500,000 years. While any one impact might be true (as a statistical fluke), it is hard to believe that several of these stories are correct. I remain skeptical.

Super-dark "Stealth" Comets

A new report in *Monthly Notices of the Royal Astronomical Society* by W.M. Napier, J.T. Wickramasinghe, and N.C. Wickramasinghe is titled "Extreme albedo comets and the impact hazard." Based on a dynamical argument, they conclude that there should be more than 1,000 times more Halley-type comets than are actually observed. They therefore suggest that the comets become invisible, and that the impactor population is dominated by bodies too dark to be seen with current astronomical surveys.

One should be skeptical of a theoretical result that has no data to support it. One should be even more skeptical if it seems inconsistent with the data we do have, resolved (in this case) only by postulating a new class of "invisible" comets. But further, the idea that our astronomical surveys might miss huge numbers of such "stealth" objects is largely beside the point. We know about the low comet cratering rates from the dearth of small craters on Jupiter's Galilean satellites, especially Europa. From this perspective it seems clear that there is not a large population of stealth comets to worry us.

Proposed Rain of Mini-comets

In the late 1980s, the proposal of a tremendous flux of tiny comets (each no bigger than a bus) was widely discussed in the science media. The discoverer was a well-respected space scientist from the University of Iowa, Lou Frank, who was attempting to interpret very small, transient dark patches in NASA spacecraft images of Earth's atmosphere. Frank hit upon the idea that these dark spots were due to bursts of water vapor liberated in the upper atmosphere by disintegrating small comets, a hypothesis that he advocated at meetings of the American Geophysical Union, in published papers, and directly to many science journalists.

In spite of the excellent reputation of their advocate and invocation of NASA satellite data, an intense rain of such mini-comets was quickly recognized by most scientists as inconsistent with a wide range of other observations. The numbers of impactors proposed by Frank were a million times higher than the known flux of objects with their proposed mass. They would have to be so black that they were invisible to telescopes. Since their atmospheric impacts were also not being seen as meteors or flashes of light, they must also carry little energy.

(The absence of a flash was later confirmed when data were released from sensitive surveillance satellites that constantly scan Earth from above.) They also evidently did not make craters when they struck the Moon. Finally, the amount of water vapor they would dump in the upper atmosphere was inconsistent with the known dry conditions in the stratosphere.

Although many scientists assumed that the dark spots were just noise in the spacecraft detector, they were unable to work with the raw data to verify this speculation. The media story persisted, aided by NASA news releases supporting the mini-comets. While they shook their heads in wonderment, few of Frank's colleagues wanted to challenge him personally. His advocacy of mini-comets became an obsession—he even wrote a book called *The Big Splash* to market his ideas directly to the public. There seemed to be no polite way to make the story go away. One scientist tried, however, to counter with humor, when he proposed that the mini-comets be called Louis A. Frank Objects, or LAFOs.

Impact News in Great Britain

Based on the large sampling of press reports from both sides of the Atlantic collected by anthropologist Benny Peiser of Liverpool John Moores University, there seem to be significant differences in the press treatment of impact science stories between the United States and the United Kingdom. Many British science reporters like to play such stories for their humorous possibilities, as opposed to the straight science reporting that is standard in America. Ridiculing the "boffins" seems to be a popular way to treat scientific controversy. Another approach is to start off a story in a hyperbolic vein, only tempering the initial overstatements several paragraphs down. For example, an opening assertion might be made that an asteroid is on a collision course with Earth, but a few paragraphs later it is revealed the the probability of the impact is only one in 100,000. My impression is that the British reading public does not take this very seriously, and that their news reporting in general is intended to be more entertaining. A problem can occur, however, when such stories are picked up in other countries, where this tongue-in-cheek tone might be taken seriously. Let the reader beware.

Space science research dealing with impacts often makes a good story, especially when it is controversial. The public is likely to find science more interesting if they realize that research is carried out by real people working in a competitive environment. The controversy is very real in some cases, such as finding the cause (or causes) of the great PT mass extinction. In other cases, such as the KT mass extinction and the contemporary rate of impacts on Earth, a consensus exists based on multiple lines of evidence. While there are still many media-worthy stories, we should be skeptical of reports that the consensus has been overthrown by a single new result.

As Carl Sagan often said, "extraordinary claims require extraordinary evidence." A similar admonition might be that before revolutionary theories are widely publicized, they need to be given a reality check. This is best done by the scientists deciding whether to issue a news release. But if the scientists are not self-policing, the burden falls upon the journalists to filter the signal from the noise, or upon the skeptical attitude of the reader.

Note

1. This quote is from a perceptive article ("In Extinction Debate, Dinosaurs and Science Writers are the Losers") by Rob Britt at Space.com, 14 October 2004; see www.space.com/scienceastronomy/dinosaur_debate_041014.html. □

INTUITION: CASE OF THE UNKNOWN DAUGHTER
Continued from page 13

she was conceived; and, I believe there were other, more subtle clues.

If my assessment is correct, it further demonstrates that clues can indeed be rationally assembled unconsciously to uncover a mystery. Myers (2004, 128) observes "that, more than we've realized, our lives are guided by subterranean intuitive thinking." Giving "evidence of intuition's powers," he says, are "*right-brain thinking*—split-brain persons displaying knowledge they cannot verbalize"; *thin slices*—detecting traits from mere seconds of behavior"; "*intuitive expertise*—phenomena of nonconscious learning, expert learning, genius"; and, among many others, "*creativity*—the sometimes spontaneous appearance of novel and valuable ideas" (Myers 2004, 127).

However, he also cautions against the perils of intuitive thinking, including "powerfully flawed intuitions about gambling" (Myers 2004, 225). He warns of the following: "*Memory construction*—influenced by our present moods and by misinformation, we may form false memories and other dubious testimonials"; "*misreading our own minds*—often we don't know why we do what we do"; "*hindsight bias*—looking back on events, we falsely surmise that we knew it all along"; "*overconfidence*—our intuitive assessments of our own knowledge are routinely more confident than correct"; "*illusory correlation*—intuitively perceiving relationships where none exist"; and others (Myers 2004, 128).

Cautions notwithstanding, I must admit to a new appreciation of intuition, without which I would not have known of my wonderful daughter—and two grandsons! It is enough to warm an old skeptic's heart.

Note

1. For a follow-up, see my poem, "The Discovered Daughter" (with a brief commentary), in *Family Matters: The Newsletter of the Secular Family Network* 7:3 (Fall 2004), p. 7.

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Ringing False Alarms

Skepticism and Media Scares

The American public gets from its news media a steady stream of "wake up calls" to panic over—daily or weekly alerts of things to worry about, crises to address. Though many of these problems are real, others are little more than phantom fears. Since the news media give us no way to distinguish the real problems from the exaggerated ones, the best antidote is a healthy dose of skepticism.

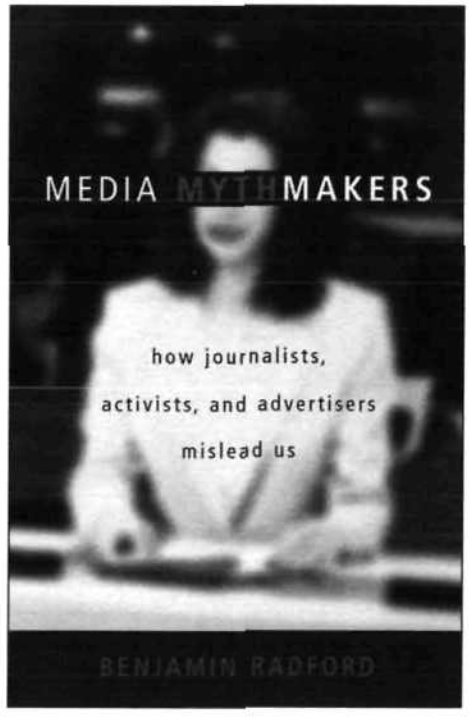
BENJAMIN RADFORD

The news media both inform and misinform their audience. As John Ruscio discussed in his SKEPTICAL INQUIRER article "Risky Business: Vividness, Availability, and the Media Paradox" (March/April 2000), journalists' alarmist coverage creates misperceptions about the world. News outlets jockey to be the first to warn the public of some new menace, sensationalizing the problems in the process. The list of crises that the news media report on seems endless: shark attacks, heat stroke, anthrax, missing children, weapons of mass destruction, killer bees, snipers, flooding, breast implants, rising crime, airline crashes, and so on.

Diseases provide reliable fodder for alarmist headlines: warnings about Severe Acute Respiratory Syndrome (SARS),

AIDS, and anthrax appeared in the news in recent years. Influenza kills about 37,000 Americans annually, yet up until very recently it was exotic and exceedingly rare diseases like West Nile Virus, Mad Cow Disease, and ebola that grabbed headlines and worried the public. In the last few years the pendulum has swung back, and flu is a danger once again, with each year being touted the worst flu season ever—and each year the pronouncements are proven false. As David Brinkley said, "The one function that TV news performs very well is that when there is no news, we give it to you with the same emphasis as if there were."

In this fear-charged atmosphere, how are we to tell which topics are truly dire threats and which are simply chimera? In many cases, the problems that the news media, activists, and politicians hype are real enough; however they are frequently greatly exaggerated and mischaracterized, and the solutions proposed to fix those problems do little or nothing to actually address the issues. Here I bring some skepticism to bear on media scares of recent years.



Exploiting Exploited Children

No politician or government official ever lost votes by proposing or endorsing laws that protect children. The effort to protect children from predators is in many ways a business, and business is good. Whether or not children actually need the protections created in their names is a frequently ignored question. Images of children are routinely used for political purposes. Politicians and legislators know that supporting and proposing bills helping children will benefit them, and voting against any bill that might affect children is inviting attack from others.

Cynthia Crossen, in her book *Tainted Truth*, notes that "Since bigger numbers almost always mean bigger allocations or more attention, most of the numbers flying around policy debated exaggerate on the high side" (Crossen 1994). Many advocates and activists happily inflate their crises for attention. Denny Abbott, former national director of the Adam Walsh Child Resource Center, has stated that "In my twenty-five years in social services, I have never seen an issue as exploited as the problem of missing children" (Abbott 1999).

The Department of Justice estimated that 440,000 children were lost or otherwise missing each year; such numbers are alarming but very misleading. David Finkelhor of the University of New Hampshire and director of the Crimes Against Children Research Center conducted a Justice Department study that found that the 440,000 figure includes children missing for any amount of time ranging from a few minutes to overnight. Another analysis of the Justice Department figures (this one done by Statistical Assessment Service) found that 12 percent of the "lost" children simply forgot the time while 19 percent misunderstood parental instructions. In all, nearly three-quarters (73 percent) of the "lost" children were home within 24 hours.

While the term "missing child" may conjure up visions of malevolent, trenchcoated men luring children into their cars with candy or Pokémon cards, the reality is much different. The vast majority of "missing" children are taken by family members, such as when one divorced parent absconds with a child during legally sanctioned visitation. That may not be where the child should morally or legally be, but it is a far cry from a dangerous stranger's clutches. This puts the term *missing* in a whole new light, since at least one parent knew exactly where the child was. *Missing* then is used as more of a legal word regarding the child's status than a descriptive one describing the child's whereabouts.

Between 1990 and 1995, the National Center for Missing and Exploited Children (NCMEC) handled only 515 stranger abductions, 3.1 percent of its caseload. Just as a child fifteen minutes late for dinner can be considered a "missing or lost" child to inflate the figures, so too can runaways be counted among the missing. Though a child or teenager leaving home voluntarily may be in trouble, he or she isn't quite "missing or lost" in the usual parlance (Wilson 1995).

University of Southern California sociology professor Barry Glassner (1999, 61) wrote of the fallacious missing children panic in his book *The Culture of Fear*:

> In national surveys conducted in recent years three out of four parents say they fear that their child will be kidnapped by a stranger. They harbor this anxiety, no doubt, because they keep hearing frightening statistics and stories about perverts snatching children off the street. What the public doesn't hear often or clearly enough is that the majority of missing children are runaways fleeing from physically or emotionally abusive parents.

In 1985 the *Denver Post* won a Pulitzer Prize for a series of articles investigating the child abduction scare. The investigation found that the numbers had been grossly exaggerated, frequently by child advocacy groups. One child safety expert, Gavin De Becker, pointed out that, compared to a stranger

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Benjamin Radford is managing editor of the Skeptical Inquirer. *This article is excerpted from his book* Media Mythmakers: How Journalists, Activists, and Advertisers Mislead Us *(Prometheus Books, 2003), which was chosen by* Choice *library journal as an Outstanding Academic Title in 2004. More information and excerpts can be found at www.mediamythmakers.com.*

kidnapping, "A child is vastly more likely to have a heart attack, and child heart attacks are so rare that most parents (correctly) never even consider the risk" (De Becker 1999).

Bad Numbers and Bad Journalism

Bad science and flawed statistics surround us all the time, and part of the journalist's role is to help separate the good from the bad information. But when dubious science combines with poor journalism, the results are far worse than either alone. On September 10, 2001, University of Pennsylvania professor Richard Estes called a press conference to announce the results of a three-year investigation into child sexual exploitation, "The Commercial Sexual Exploitation of Children in the U.S., Canada, and Mexico." Many of Estes's findings, such as that most children are abused by someone they know, fit well with what was already known on the subject. But it was his most shocking finding that made headlines and drew the crowd: Up to 400,000 children each year are victims of childhood sexual exploitation.

Journalists know—or should know—enough to dig a little deeper than skimming the press conference materials for their stories, especially when the results are widely at variance with previous estimates and studies.

The study's findings made international news, partly because the number was much higher than any previous studies had indicated, anywhere from two to ten times higher. Estes referred to the widespread exploitation he found as "the nation's least recognized epidemic."

The figure Estes came up with is important because up until that time, estimates of the number of children involved in the commercial sex trade were sketchy at best. The three-year, $400,000 Estes study was the strongest evidence to date on the subject. A spokeswoman at the American Bar Association's Center for Children and the Law was quoted in a *USA Today* article, saying, "This looks like it's the most comprehensive study yet" (Memmott 2001). So it wasn't just a new study; it was touted as the *best* study to date.

Estes himself said he was stunned by the numbers he and his co-author Neil Weiner came up with. "That figure just blew our minds. We never . . . thought we would encounter so many children in this predicament," he told a Reuters reporter (Estes 2001).

The number Estes found came as a surprise to other researchers as well—including professor David Finkelhor, who called the numbers "terribly flawed" and said that "there are serious questions about whether the study's findings have been greatly exaggerated." Finkelhor should know, as the Estes report was based largely on studies he had done ten years earlier.

Soon after the Estes report was made public, Finkelhor issued a short news release commenting on the study. It read in part, "The new report . . . relies extensively for its estimates of the national scope of the problem on data gathered in earlier studies by ourselves and some of our colleagues. Unfortunately we do not think that the data from our studies support the estimates that have been extrapolated in this new study. Overall the estimates in the new study have been generated making assumptions that are very speculative, in some cases mistaken, and not well supported by national research. Sometimes estimates derived from very different and incompatible populations have been combined to reach a conclusion. In addition, the new report makes an obvious mistake of counting many children two or more times."

Finkelhor went on to cite several specific examples of errors, such as assuming that youth who were gone from their homes for a week or more were in shelters or on the streets, and therefore very vulnerable to exploitation. Yet Finkelhor's study found that most runaways stay with friends or relatives, and only a small number were in shelters or on the streets. "Since the new study is likely wrong in this assumption, the number of victims of commercial sexual exploitation could easily be half of their estimate or less." The statement concludes, "[W]e are of the opinion that at the present time we do not have adequate research to make an accurate national estimate, and certainly not using the speculative assumptions in the new study. It is important for everyone concerned about the well-being of children that we have numbers that are scientifically defensible and cannot be dismissed by skeptics." The basic problem, according to Finkelhor, was "a lack of experience and a lack of understanding on how to deal with epidemiological data" (Finkelhor 2002).

One might think that a shockingly high number such as nearly a half-million child victims, dramatically higher than any previous estimates, would have set off alarm bells that perhaps something was wrong with the study or its data. Though he did not publish the findings in a peer-reviewed journal, Estes claims that the study was subjected to peer review. Regardless, Finkelhor says that Estes and Weiner never consulted with him about the use of his data. Finkelhor adds that the Estes report is not without some merit, calling the information on child exploitation pathways "very useful" and the policy recommendations excellent. His main complaint is what the story's hype was all about: the big numbers were "entirely premature and without scientific basis."

In science, as in the rest of life, mistakes can be made, methodologies can be flawed, and numbers can be miscalculated. Ultimately, Finkelhor blames the news media for their lack of skepticism: "The biggest failure was the journalists' failure to question the findings." Journalists know—or should know—enough to dig a little deeper than skimming the press conference materials for their stories, especially when the results are so widely at variance with previous estimates and studies. Reporters should ask if the results have been published or peer-reviewed, and seek commentary from others in the field.

Yet out of all the news outlets that covered the story, apparently only one or two sought out and published comment from other researchers critical of the study. The Associated Press and ABC News duly reported the results of the Estes study—and quoted Finkelhor's rebuttal. John McKenzie of ABC News pursued the story, and Finkelhor got a few seconds of rebuttal time on the *ABC Nightly News* that evening.

The reporting on the whole was abysmal. Not only were skeptical and informed researchers not questioned, but at least one of the very few experts cited as endorsing the study claims to have been misquoted. Remember the woman from the American Bar Association, quoted in *USA Today* as supporting the study? She told me that "I did not make the statement attributed to me in *USA Today* and I never endorsed the study. I regret that the reporter chose to mischaracterize our conversation" (Klain 2002). The reluctance of other experts to endorse the study should have raised questions in journalists' minds.

The results of the study were very quickly overshadowed by the September 11, 2001, terrorist attacks. But the damage had been done. Six months later, an Internet search turned up more than fifty articles and Web pages citing the Estes study and his claims of 300,000 to 400,000 annual child victims. Of those, fewer than a dozen mentioned Finkelhor's criticisms. The inflated numbers will almost certainly be cited and repeated in the years to come, one more dubious factoid to rebut and muddy the issues.

Racist Church Fires

In May 1996, a rash of twelve church fires was reported nationwide, five of which served mostly black congregations. The arsons were seen by many as being racially motivated, fueled in part by stories like the one that appeared in the September 2, 1996, issue of *Newsweek*. Below the headline, "We Live in Daily Fear" is the slug, "Greenville, Texas, thought it had outgrown its racist past. That was forty-one fires ago." The article went on to describe two recent church arsons in the town of Greenville (Miller and Peyser 1996).

Curiously, the article notes that, in the case of both Greenville churches highlighted therein, "[P]olice recently charged a retarded 18-year-old black man with both church blazes." If that's true, (and the man did in fact do it) why did the reporters frame the story as racially motivated? This seemingly-thesis-nullifying statement is soon brushed aside for a discussion on Greenville's racist past. The jump was already made, the news bias was already set: The fires were motivated by racism. Any facts suggesting otherwise are to be ignored or downplayed.

The following month President Clinton highlighted the problem in an address to the nation and announced that a national task force would be organized to investigate and combat the crimes. A year later the task force concluded that many of the 429 fires they examined were not racist but copycat crimes. They found no evidence of a racist conspiracy or even a clear pattern to the crimes. Many were committed by individuals acting alone, and of those arrested, 42 percent were juveniles. Though some of the fires were traced to racist motives, other arsons were committed for profit, vandalism, and revenge. Of the 199 people arrested in incidents dating back to 1995, 160 were white, thirty-four black, and five Latino.

NEWS OF THE WEEK

BLACK CHURCHES

'We Live in Daily Fear'

Greenville, Texas, thought it had outgrown its racist past. That was 41 fires ago.

BY MARK MILLER AND MARC PEYSER

BETTY FRANKLIN installed smoke detectors in nearly every room of her house, but they don't really help her sleep better. It's hard to relax when some part of the city around her goes up in flames almost every day. First it was the churches—two black churches in Greenville, Texas, set aflame in June as the rash of black-church fires swept through the South like a hot, ugly wind. But it didn't stop there. Empty houses, a carwash, the old bus station and hotel—arsonists even came back three times to finish burning one vacant house. In all, 41 suspicious fires have scorched Greenville this summer, almost all of them striking the older, poorer, primarily minority section of town. No one has been seriously injured, unless you count the souls and spirits of Greenville's 23,000 residents. "Everybody's tempers are short. We're real tense," says Franklin, a 43-year-old social worker. "We live in daily fear."

As federal investigators continue to search for clues to the dozens of black-church burnings this summer, tiny Greenville is facing perhaps the most wrenching hunt of all. Most of its fires remain unsolved, though police recently charged a retarded 18-year-old black man with both church blazes. But it's not just clapboard and shoetrack that are being destroyed. Like many towns of the New South, Greenville believed it had paved over the racial fissures that once divided its citizens. Whites hoped blacks had forgotten the sign that once spanned the city's main street: GREENVILLE, THE BLACKEST SOIL, THE WHITEST PEOPLE. Blacks thought some integration meant whites had accepted them as equals. The fires have ruptured those dreams by a disappointment and distrust that have darkened this old cotton-mill town with an ashy film. "Neighbors are pointing at each other: blacks at blacks, blacks at whites, whites at blacks," says Bill Glenn, an NAACP official and Greenville native. "Paranoia is rampant."

That's probably because it was never buried very deep. The locals still talk about the white mob who hunted a black man to death on the town square in 1868. When a sign hangs over your town proclaiming it home to the "whitest people," it's hard to forget even ancient atrocities. No one is exactly sure when the town fathers removed the sign, though it was some time after it had been refitted with neon lights. But even after that, Greenville struggled to close its racist wounds. In the early 1980s, a white woman reported seeing a black man driving frequently to a local pond with out-of-state license plates. After circulating a photo labeled SUSPECT SUSPECT, police arrested Lenell Geter, an aerospace engineer who had recently moved to town. Even though Geter testified he visited the pond to watch fish, he was convicted for a crime he didn't commit. Only after "60 Minutes" investigated was Geter freed.

The cop who fingered him remains on the Greenville police force.

And it's that same force that has become the focus of blacks' fear as their part of the city burns building by building. The suspect in three of the fires is an African-American with an IQ of 50 named Mark Anthony Young. He confessed—with no lawyer present—to burning the churches and another building, but later recanted and pleaded innocent. Many blacks believe that the police—with only one African-American on the 35-man force—stalled a black man to quash the notion that race is a factor in the fires. "The authorities won't pursue any white leads, no matter how legitimate," Glenn says. In fact, police arrested two white men and a Hispanic in connection with the fire at the New Light House of Prayer church. They were released, even though the mother of one suspect says her son was smoking crack behind the church just before it burned. All of which makes some blacks disheartenedly wish for the days of the neon sign. "That town was better than this town," says Bill Glenn's wife, Barbara. "At least you knew what to expect. You knew."

Many whites can't understand why blacks talk like that. Greenville has clearly made some strides in recent years. Many black families have moved to the more prosperous part of town. The schools are integrated. If there aren't many African-Americans on the police force, says Mayor Sue Ann Harting, that's because they haven't applied. "We advertise everywhere encouraging everyone humanly possible to take the test," she says. "To blame that on the white community is completely wrong." Harting believes that the fires are an anomaly that will prove to have nothing to do with race. "When the dust settles, I think we're going to see another young individual who is having some problems in their personal life, and this is a way for them to act out," she says. In fact, the church fires have begun to bring the community back together a bit. Corporations and individuals have contributed more than $350,000 to rebuild the sanctuaries. At the groundbreaking for the buildings two weeks ago, the audience was a multihued sea of faces who shared spicy barbecue and sweet talk for the future. The highlight came when Wanda Jeffery, whose father is pastor at the decimated New Light House church, sang "Victory Is Mine." The question is, can that sentiment survive the fire—next time? ■

September 2, 1996, report in *Newsweek* on "racist church fires."

The Insurance Information Institute, a trade group that collects data regarding insurance companies, examined the rash of fires and concluded: most of the fires were set by serial arsonists; the number of fires in white churches also increased in 1995; in Florida, Georgia, Tennessee, Oklahoma, and Virginia fires destroyed more white churches than black ones; and that in nine of fifteen black church fires black suspects were named ("Conspiracy" 1996).

Some fires were started by churchgoers. Eric Daniel Harris, a former pastor of a rural Baptist church, confessed that he set his own Kentucky church on fire. Harris, who had implied that he thought the fire was either a hate crime or an act of vandalism, said he burned his church to unite his flock.

Perversely, Clinton's announcement actually led to more, not fewer, church arsons: following the president's speech, the

number of incidents nearly quadrupled. Forty-seven churches were targets of fires or bombs, nineteen of which were black churches. This increase was mainly attributed to copycat crimes: Treasury Secretary James E. Johnson reported that some of those arrested said "they saw it on the news, and this became the thing to do."

An editorial in the June 11, 1997, *Albuquerque Journal* reflected on the rush to judge: "It was far easier last year to jump to conclusions from the meager information and wealth of speculation. It was widely asserted that the fires were sparked by racism in America. . . . Victims of the May 1996 fires, however, were not exclusively black or even mostly black. Of the twelve churches torched in May 1996, five served predominantly black congregations. The destruction of houses of worship turns out to have been an equal opportunity crime cutting across racial, ethnic, and ecumenical lines" (Walz 1997).

The "slave ship" that made international headlines in 2001.

The Bounty Hunter Threat

On August 31, 1997, five masked men in body armor burst into a home in Phoenix, Arizona, held three children at gunpoint and killed two people. Christopher Foote, twenty-three, and his girlfriend Spring Wright, ninteen, were shot to death in bed. When two of the suspects, Michael Sanders and David Brackney, were arrested, the pair explained that they were bounty hunters pursuing a bail jumper. Foote and Wright were shot, they said, in self-defense.

The media picked up on the story and it made international news. The idea that overzealous bounty hunters could kill innocent people in a no-knock predawn raid was unconscionable. Bounty hunters were depicted as reckless, violent renegades, answerable to no one while violating private citizens' rights with impunity. The furor was further fueled when it was publicized that bounty hunters had some legal powers that even police don't have. The news media dug up other people who had been victimized by the bounty hunting industry, who told their tales of abuse by bounty hunters and indifference to catching the wrong person. Professional bounty hunters lamented the slayings and admitted that they knew the day would come when one of their peers would step over the line. Foote's sister handed out flyers and protested, demanding accountability for bounty hunters. One state representative introduced legislation that would clean up the licensing and regulation of the sleazy, loose-cannon business. The killings prompted a new Arizona law requiring bounty hunters to be licensed and to get permission from a home's occupants before entering.

Amid all the public, activist, and legislative outrage, one little detail went virtually unnoticed: *The group weren't bounty hunters.* Phoenix police determined a few weeks later that the whole thing was a robbery, and that Sanders had lied about who they were. No one had jumped bail, no one was wanted by the police. Some news media grudgingly and cursorily updated the story, but by that time the tale had too much inertia for reality to slow the story's speed. The news media, anti-gun activists, and politicians had too much invested in the fable of the killer bounty hunters to conscientiously correct the facts.

Perhaps the bail-jumper retrieval business needed regulatory overhaul anyway. There may have been legitimate reasons to introduce legislation regarding bounty hunting, but the deaths of Christopher Foote and Spring Wright weren't two of them. Not every news story is a call to arms demanding action, and the public needs to be wary of jumping to conclusions and vote-getting political quick fixes using taxpayer dollars.

The Phantom Slave Ship

An international crisis arose in April of 2001, when stories came out of Cotonou, Benin, that a Nigerian ship carrying hundreds of child slaves was lost at sea. The children, the stories said, were on a rusting and decrepit hulk that lacked fresh food and water and was bound for slave work on cocoa plantations. Nicolas Pron, a program manager of UNICEF in Benin, announced that his organization was "concerned about the health, nutrition, and psychological welfare of these children. . . . They are very likely in unsanitary circumstances. We don't know about food. We don't know about water." Esther Guluma, another UNICEF official, added that they were "quite worried because from what we know of the condition of the boat, it is not seaworthy" (Farah 2001).

The story made nightly news broadcasts around the world, and alarmed politicians, journalists, and aid workers scrambled to rescue the poor children. The National Association for the Advancement of Colored People issued a statement praising the international efforts to find the ship and urging President Bush and the U.N. to "take every step to return these children to normal lives and punish those responsible for this horrific traffic in human life." For several days the fate of the ship was unclear:

Had it sunk? Had it returned to ports in Cameroon or Gabon? Government authorities said they did not have the resources to search for the missing ship, and appealed for help from Britain and France, both of which had navy ships in the area.

Finally the dangerous slave ship docked in Cotonou port on Monday, April 16. Relief workers rushed to the ship to rescue the malnourished slave children. Instead of a ramshackle boat in danger of sinking, they found a clean ferry in good condition, with a fresh coat of paint and adequate drinking water. Where were the hundreds of slaves? Douglas Farah of the *Washington Post* Foreign Service explained, "There were perhaps a dozen teenagers on board who were not on the ship's passenger manifest and were called unaccompanied minors, sources said, but the young men were in good health and apparently were job hunters, not slaves" (Farah 2001).

Refusing to believe that the ship didn't hold slaves, rumors—some started or repeated by Pron of UNICEF—circulated that the captain may have drowned the children while at sea (the passengers and crew on board denied this), or that a second, unknown mystery ship was really the slave ship and was still to be found (no evidence of a second ship ever appeared). In a classic example of rumormongering, the story apparently changed from a (mistaken) consul report claiming that the ship was in poor condition; to a story of a few children on board the rusting boat; and finally to an account of hundreds of slave children on a dangerous ship without water. It was not even clear who introduced the slavery element into the story.

The panicked reports by Beninese officials, UNICEF, and relief organizations were wrong in almost every respect. Embarrassed and discredited officials put the best spin they could on the events. Said one, "This appears to be a fiasco, but if it brings attention to a very real problem then it is not a bad thing." There is no doubt that modern slavery exists throughout the world, including child slavery in West Africa. But crying wolf with bad information is ultimately counterproductive, and misinformation and lies in the service of truth are still lies.

In many cases it appears that children in West Africa may be in more danger from the aid workers themselves than from child slavers. In 2001, refugee children in Liberia, Guinea, and Sierra Leone accused dozens of relief workers of exploiting and sexually abusing them. In some cases, girls reported being forced to give sexual favors in return for food, shelter, or medicine. The allegations of widespread abuse named more than forty well-established relief agencies and nongovernmental aid organizations, according to the United Nations High Commissioner for Refugees. Paul Nolan, child protection manager for aid group Save the Children, said the investigation uncovered "possibly endemic" abuse, and that "there is a serious problem of child exploitation" (Coleman 2002).

Relatively few journalists bother to write more than a superficial treatment of the issues involving modern African slavery. One of the few who did, Norimitsu Onishi of the *New York Times* Service, wrote on African boys working in the Ivory Coast. Trying to verify information circulated by the Western news media that thousands of foreign children (UNICEF estimated 15,000) worked in slave conditions on cocoa plantations, Onishi went to look for himself. During a weeklong investigation he found only a handful of working children, not the hundreds or thousands claimed in news reports: "The discovery of just a few foreign children during visits to dozens of plantations suggests that children who are smuggled by a stranger for profit do not make up a significant share of the cocoa force here." Onishi points out that "Child labor retains deep roots in Africa but it is hard to measure, and the line between slave trading and the bondage of poverty is sometimes unclear. . . . Much of the confusion stems from the working conditions here. Backbreaking work for 50 cents a day is part of everyday life in much of Africa. Indeed, that wage puts plantation workers at a very low rung, but hardly at the bottom rung, of the ladder in Africa" (Onishi 2001).

Onishi describes the problem of child labor in its context, instead of from a patronizing Western point of view. The issues and causes are complex and do not lend themselves to short sound bites demonizing landowners as inhuman and parents (willing to send children to work) as greedy and uncaring.

The issues highlighted here are real, and important: child safety, slavery, racism, crime. But misinformation taints important findings and hinders progress. The better we understand the problems the better we can craft solutions. These examples, and many others, highlight a failure by news media and the public to exercise skepticism and check the facts. The public needs accurate information in order to make sound decisions, and skepticism extends to media literacy and social issues as well.

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The Glaring Garret Ghost

Since 1878, the horror-stricken face of Henry Wells has supposedly glared from the garret window of the Pickens County Courthouse in Carrollton, Alabama. Is it real?

MARK W. DURM

People from all parts of Alabama, and also from neighboring states, travel to a remote town in west Alabama named Carrollton, the county seat for Pickens County. People come not to shop or trade but to gaze upward at a garret window on the Pickens County Courthouse.

To aid the curious travelers, there is even a yellow sign, fastened to the brick building, which has a black arrow pointing toward the phenomenon in the window pane. Is this curiosity a true apparition or simply a physical anomaly? Legends and books such as *Phantom Army of the Civil War and Other Southern Ghost Stories*, edited by Frank Spaeth, *Ghost Stories from the American South*, edited by W.K. McNeil, and *13 Alabama Ghosts and Jeffrey*, by K.T.

Windham and M.G. Figh, claim it is an apparition that has glared downward for more than 125 years. Investigation of the matter seemed in order. To begin with, I'll present the "ghost tale" succinctly and then deal with the truth in detail.

The Tale

It was an unusually hot day for February, and black clouds billowed as a rare storm grew to the west of Carrollton, Alabama. The afternoon air was thick, but in Carrollton, a more ominous storm boiled. A gathering mob spilled into the street like a flock of blackbirds screeching and swooping into the dying trees of a gray fall day. The mob, ungainly yet knitted together by its purpose, moved, surging, staggering, and then surging again, toward the courthouse where Henry Wells paced his cell in terror.

Wells could hear the distant thunder. He watched as his cell darkened, not with cool afternoon shadows, but with the peculiar dimness that precedes a large, violent thunderstorm. And he could hear the drunken, heavy shouts from the mob. They had a rope. They were coming to murder the man who burned their courthouse to the ground two years before.

A nervous deputy clanged the key into the lock, and Wells bolted from the darkening cell. He ran to the top floor of the courthouse, toward the freedom of the sky. Henry Wells ran as fast as he could up and away from the push of the murderous mob. But soon he could run no more. He was left to watch from the garret windows as the churning, muddy river of men washed against the courthouse.

The air was still, and thunder boomed around the building. The mob grew louder. Wells struggled to breathe as the storm intensified, thunder belatedly announcing the wild, heartless power of lightning. The mob crashed through the courthouse door and Wells screamed in terror. His eyes unfocused and his chest heaving, he screeched, "I am innocent. If you kill me, I will haunt you for the rest of your lives!" Wells's desperate cry was punctuated by a stunning white flash of lightning and a blast of thunder that rattled the building like an earthquake. The mob staggered and stopped, but bolstered by whisky and hatred, it soon moved forward.

Henry Wells died hanging from a bare tree limb outside Carrollton that day, the cleansing rain splattering and running down the rope to his bare neck. He died, but he has yet to be forgotten in this small Alabama town.

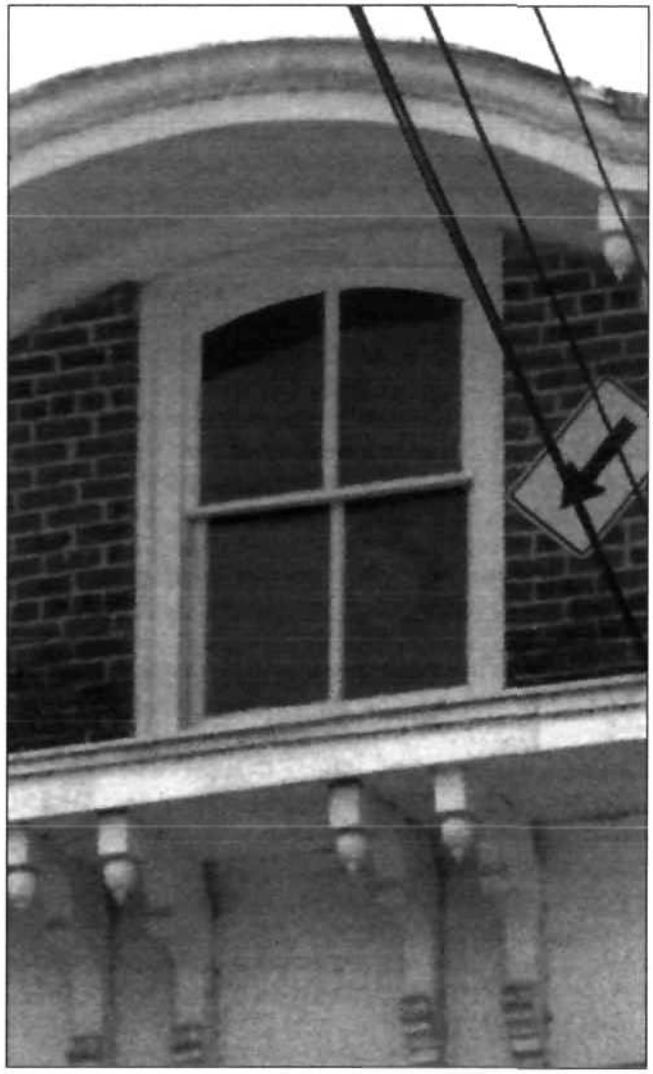
The next day one of the members of the mob looked up at the courthouse and noticed Henry Wells's horror-stricken face staring back at him from the garret window.

Since that fateful day in 1878, there have been many hailstorms, thunderstorms, and other natural events. Every window in the courthouse has been broken, but the window with Wells's grotesque image remains intact. Gasoline, soap, and myriad other cleaning agents have failed to remove the ghost from the glass.

Henry Wells, in the end, was true to his word. He haunts Carrollton yet.

The Truth

Henry Wells may well have burned the courthouse in Carrollton during a burglary, but he was not lynched. He died from two gunshot wounds after signing a confession to burglaries and arson. By the way, Wells departed this earth Sunday, February 3, 1878, more than two weeks before windows were installed in the new courthouse.



A ghostly face at the Pickens County Courthouse. Photo credit: Marilyn Brown.

Stories from the *West Alabamian*, Carrollton's only newspaper during the time of Wells's demise, make it clear that the story of the ghost in the courthouse window is probably a combination of the true accounts of the deaths of Nathaniel Pierce, who was lynched in 1877, and Wells. According to a story in the newspaper, the courthouse was burned November 16, 1876. Nathaniel Pierce, who was being held on murder charges in the courthouse before it was burned, was lynched September 26, 1877, by a disguised mob. Fifteen months after the courthouse burned, Wells was discovered working on a plantation near Fairfield and was shot trying to evade arrest for the burglary and arson of the courthouse.

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The burning of the courthouse was extremely emotional for the town. Carrollton's first courthouse was burned by Union soldiers near the end of the Civil War for no tactical reason. The citizens of Carrollton scraped together the money and, at great expense, built the second courthouse—the one that Wells is alleged to have burned. The building became a source of great pride to the town as well as a symbol of its re-emergence from the ashes of war. So it is easy to see why such an emotional ghost story could grow around the burning of that courthouse.

The anonymous writer of a pamphlet about the ghost in the courthouse window seemed to sense the true source of the story when he began his publication this way: "*It is a queer thing that repetition without contradiction often comes to be taken as* truth, and in this case a story has been so often repeated that it is here set down, at least partly as true." Partly true . . . .

From the October 3, 1877, *West Alabamian*:

> On Wednesday night, the 26th of September, a band of armed men entered our county jail, where Nathaniel T. Pierce was confined under charge of murder of Thomas C. Kilpatrick and William T. Story, took Pierce from the jail, carried him about a mile from our village and executed him. We obtained from Mr. Spain, the Deputy Sheriff, the following statement of facts connected with this dreadful occurrence:
>
> Henry & Gilbert—In reply to your request to furnish for publication a statement of facts connected with the summary execution of Nathaniel T. Pierce by a mob, I can state that it occurred about 11 o'clock last Wednesday night, the 26th of September, 1877. Being deputy sheriff of the county, I occupied a room adjoining the jail, and had retired to bed about twenty minutes before the occurrence. I heard the word halt given at the jail yard gate in a voice not recognized. I immediately got up. Some one tapped at the door, and I advanced and opened it. Seven or eight armed and disguised men entered my room and demanded the jail keys, which I refused to deliver. They presented their pistols at me, carried me to the jail door, and forced me to unlock it. Three of these men walked in, seized Mr. Pierce, brought him down stairs, threw him on the ground and tied him. Pierce was then put upon a horse, and in great haste taken out of the jail yard. There were about fifteen armed and disguised men at the jail. A number of others, I understand, were stationed at different points about the village. I recognized none of the men, and yielded to this armed force only when it was impossible to resist.
>
> J.F. Spain, Dep. Sheriff

From the November 22, 1876, *West Alabamian:*

> On last Thursday morning our Court House was discovered to be on fire, and in about two hours the building was entirely consumed, with all the books and records of the Probate Court. The Sheriff's books, and some of the most important books of the Circuit Clerk's office were saved. The great loss sustained was the burning of the Probate court records. This loss is impossible to estimate. It is indeed a calamity upon our county. The building was new, and had been recently constructed at a cost of some eighteen or twenty thousands dollars. It was a credit to the county. The burning was unquestionably the work of an incendiary. It took fire in several places about the same time.

From the December 13, 1876, *West Alabamian*:

> On last Monday, the Commissioners Court of this county met for the purpose of taking action in the matter of a court house. After the subject had been fully considered, the court concluded to rebuild upon the old foundation. The cost of rebuilding will only be about one-third of the cost of the building destroyed.

A side note from the same edition:

> Circumstances point to Henry Wells and Bill Buckhalter, freedmen, as the parties who robbed the store of Burris and Graham at Reform, on Tuesday night of last week. Some of the stolen goods were found on their premises.

"Seven or eight armed and disguised men entered my room and demanded the jail keys, which I refused to deliver. They presented their pistols at me, carried me to the jail door, and forced me to unlock it."

The crime happened at about the same time as the courthouse burning. Wells and Buckhalter apparently fled the area the morning the courthouse was destroyed; Buckhalter went to Tuscaloosa and Wells went to work on a plantation near what was to become Birmingham.

The courthouse was again mentioned in the newspaper February 21, 1877, in an announcement of a bid opening, and on December 19, 1877. The latter story read:

> Work on the new courthouse is progressing rapidly under the personal supervision of those energetic contractors, Messrs. Smith and Shull. We are informed the roof will be completed *during the present week, when the carpenters and plasterers* can work without interruption.

Notice that the roof was not even going to be completed until just prior to Christmas. From the January 23, 1878, issue of the *West Alabamian*:

> *Through the kindness of Mr. John L. Hunnicutt we are* enabled to give our readers a graphic account of the capture of Bill Buckhalter [sometimes spelled Burkhalter], whom it is alleged was implicated in the burning of our courthouse, on Thursday morning, November 16, 1876, and who was apprehended near Tuskaloosa last week, brought back, and now languishes in our jail.

The story adds that Buckhalter left Carrollton the morning of the fire and had been a fugitive since. Wells's involvement in the courthouse fire is outlined later in the story, in an account of Buckhalter's confession to the arresting officers:

> He also states that Henry Wells burned the court house; that he went there with him and saw him go into the probate office, light a candle and search the room. He left Henry in the office, and went down near Mr. Cohen's stable and waited for him. In a few minutes Henry came up and told him that he had set the d—m thing on fire, and that he got nothing out of the office only some tobacco.

Wells's name was mentioned again in the *West Alabamian* in the January 30, 1878, issue:

> We shift the form to make room for the glad tidings of the capture of the notorious outlaw, Henry Wells. He was arrested yesterday morning on the plantation of Bill McConner, near Fairfield, Ala., by Messrs., H. C. and W. B. Sawls. After his arrest he made a desperate effort to get away, but two well directed pistol shots brought him to his senses. We understand he acknowledges the "corn"—that he confesses to burning the courthouse of our county. He was identified by our young friend, B. B. Cohen, formerly of this place, but who is now clerking for Mr. Windham, near the plantation where this Negro has been employed since last fall. Henry Wells and Bill Buckhalter are now confined in our jail.

The next issue of the *West Alabamian* completes the timeline and destroys the myth of the ghost in the courthouse window. Wells's dying confession, taken on January 30, 1878, appeared in the newspaper February 6, 1878. The same issue of the newspaper noted that Wells died from gunshot wounds Sunday night, five days after he was shot and captured.

Henry Wells was not taken from the courthouse by a mob. He was not lynched. No lightning etched his agonized face on the courthouse window. Wells's face could not have been etched on the courthouse window even if he had been lynched in a thunderstorm. The February 20 edition of the *West Alabamian* announced in a small paragraph, "The windows that are being fitted in their respective places in the court room of the court house makes that building look like it was nearing completion."

The courtroom windows, not the garret windows, were placed first, because court was to be held in the middle of March, 1878. The garret windows would not be in place until weeks after Henry Wells died.

Epilogue

The image in the Carrollton Courthouse window can be seen to this day and is still being seen by curious onlookers. It is simply an anomaly, a flaw in the glass that just happens to appear, to the imaginative mind, as a human face.

Carrollton, like Russellville, Kentucky, which has a similar story about a young girl's image appearing in a tower window as a result of a deadly lightning bolt, benefits from the "Glaring Garret Ghost" financially. People come to look . . . and they buy.

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DO EXTRAORDINARY CLAIMS REALLY REQUIRE EXTRAORDINARY EVIDENCE?
Continued from page 14

much more testimony to accept the latter than the former? Aren't we just ideologically biased against miracles? Hume's distinction can make perfect sense within the framework proposed by his contemporary, Thomas Bayes. Bayes's theorem essentially says that the probability we attach to a hypothesis, given the available evidence—let's call it P(h|e)—depends on the relationship between three quantities: (A) the probability of observing that evidence, if the hypothesis is in fact true; (B) the *a priori* probability of the hypothesis, based on prior knowledge we have of the world; and (C) the probability of observing the evidence given our prior knowledge of the world. In fact, Bayes showed that P(h|e)=(A • B)/C.

Hume's argument about the proportionality between the extraordinariness of claims and the evidence necessary to back them up can be interpreted (although Hume did not, of course, use a Bayesian framework) as saying that the *a priori* probability we attach to miracles (quantity B above) is much lower than the *a priori* probability we grant to any natural phenomenon, because we have daily experience of phenomena that can be explained naturally, and rarely, if ever, do we even need to consider supernatural causes. Furthermore, quantity C, the probability of observing the evidence given our prior knowledge, is also much lower in the case of alleged miracles, simply because nobody has ever, in fact, made a convincing case for the occurrence of a miracle, so far. Hence, the only way to increase our *a posteriori* probability that the hypothesis (the miracle) is true, given the evidence, is to increase term A in the Bayesian equation. This means to attach a high probability to the evidence, given the hypothesis in question. The only way to do that is if, as Hume put it, the chances of the testimony being false would be more "miraculous" (i.e., improbable) than the miracle itself.

Hume's argument against miracles, therefore, is neither trivial nor absurd, and it can be couched in terms of modern conditional probability. Furthermore, it illuminates important points about the relationship between evidence and hypothesis in both science and pseudoscience. Sagan (and other scholars before and after him) was right: extraordinary claims do require extraordinary evidence.

Note

1. Before Sagan formulated that statement in *Cosmos* and later works, it was made by the late sociologist Marcello Truzzi in his opening editorial in the first issue of the SKEPTICAL INQUIRER, then called *The Zetetic*, (vol. 1, no. 1 [Fall/Winter 1976]). □

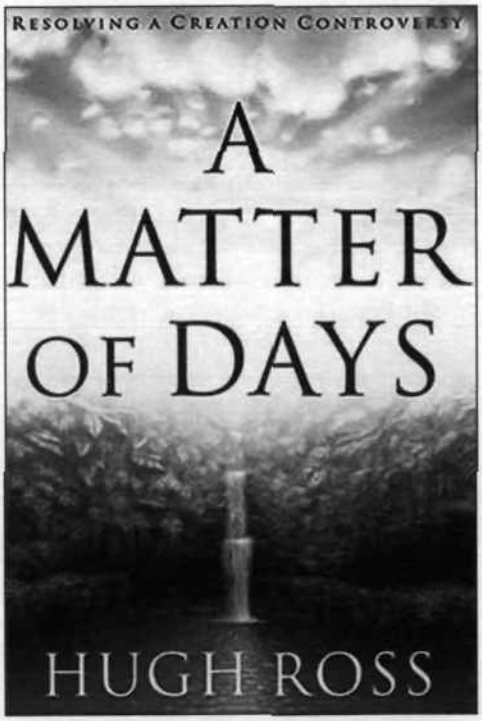
Defense of an Old Earth a Peculiar Blend of Christianity and Science

TIMOTHY H. HEATON

A Matter of Days: Resolving a Creation Controversy. By Hugh Ross. NavPress, Colorado Springs, Colorado. 2004. ISBN 1-57683-375-5. 256 pages, $15.99.

Hugh Ross is an enigma in modern creationism. As both an astronomer and evangelist (president and founder of the Reasons to Believe organization) he brings an unusual mix of science and religion to the debate. Not only does he accept and vigorously defend the astronomical and geological evidence for an old universe, but he argues that by rejecting long ages, the young-Earth creationists are ignoring some of the most profound proofs of the God of the Bible. Having been branded a "compromiser" and "false prophet" by some young-Earth advocates, Ross's latest book, *A Matter of Days*, is a thorough biblical and scientific defense of an old Earth.

Ross begins in a scriptural context, reviewing the history of Christian thought on the length of the Genesis creation days. He shows that until recently, most Christian scholars remained open to multiple interpretations. Next Ross leads the reader though a detailed study of biblical passages relevant to the age of creation, such as the meanings of Hebrew words used to measure time. He accuses young-Earth creationists of placing too much emphasis on Genesis 1 while ignoring other relevant passages. For example he cites verses indicating that God is still "resting" from his creative work, so the Seventh Day has not yet ended and must, therefore, be much longer than twenty-four hours in length.



The bulk of Ross's book is a scientific defense of an old Earth. He describes a variety of astronomical and geological processes that serve as clocks to date the universe and its components, such as the size of the universe and speed of light, the rate of expansion since the Big Bang, the age and evolution of stars, and the various methods of radiometric dating.

Since his main audience is young-Earth creationists, he pays special attention to the points on which they differ from mainstream science. He lists and addresses many creationist challenges to an old Earth, such as proposed changes in the speed of light and rate of radiometric decay, and he claims that any such changes are absurd speculations and would have side effects destructive to life. Next he addresses many of the supposed clocks cited in favor of a young Earth, such as accumulation of lunar dust, decay of Earth's magnetic field, polonium halos, and coexistent human and dinosaur footprints. He explains how all of these claims are either outright falsehoods or use faulty assumptions to arrive at young-Earth ages. Ross points out the deceptiveness of those who claim their young-Earth views are based on science. He also mocks the "appearance of age" proposal, saying that if God is deceptive in scientific matters he cannot be trusted in scriptural matters either.

Ross describes the conundrum some creationists have made for themselves by limiting the age of Earth but accepting

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certain biblical claims. For example, to explain the origin of carnivores after the Fall of Adam and the diversity of life after the Flood of Noah, some young-Earth creationists have become hyper-evolutionists—advocating rates of evolutionary change about 100,000 times faster than those accepted by traditional scientists. And because God's creation phase had already ended, the mechanism advocated for this change is a familiar one: natural selection! Having accepted that evolution can be so rapid and effective, the young Earth has to be defended at all costs because an old Earth would provide ample time for evolution to create all life. Ironically, Ross points out the quirks and problems in young-Earth creationism as only another creationist can!

As I read Ross's book I kept asking myself: When is the party going to end? Ross isn't just a traditional scientist with a Christian affiliation; he advocates many anti-science ideas himself. In his books and radio broadcasts, Ross argues that the finite age of the universe and the "fine tuning" required for life can only be explained by the God of the Bible. He rejects virtually all evolution and considers species to be individual creations of God. Whereas young-Earth creationists are forced to accept rapid evolution, Ross, with his old Earth and need for a creator, is forced to deny that evolution has any creative power at all. In this same book he claims that at least $10^{100,000,000,000}$ years would be required for life to originate and evolve on its own. In fact Ross doesn't consider 14 billion years to be a particularly long time: "The entire 14-billion-year history of the universe is much too brief to support the origin and development of life by natural processes alone" (p. 215). Sweeping statements like this pepper the book's pages. When it comes to astronomy Ross sounds like a traditional scientist, but when it comes to biology he sounds like a traditional creationist. This applies to both his methodology and conclusions.

At the end of the book Ross presents a list of predictions for the young- and old-Earth creation models to help resolve the controversy: thirteen for astronomy, three for anthropology, and two for theology. For example:

> The number of scientists (both Christians and non-Christians) who conclude on the basis of physical evidence alone that the universe and Earth could only be thousands of years old will soon grow from essentially zero to millions. (Young-Earth model)
>
> The number of scientists who conclude based on physical evidence alone that the universe and Earth are only thousands of years old will remain at essentially zero. (Old-Earth model)

Though popularity isn't a good measure of truth, most scientists wouldn't argue. But look at this example from anthropology:

> Research will prove that Neanderthals were fully human, the offspring of Adam and Eve. (Young-Earth model)
>
> Research will prove Neanderthals made no contribution to the human gene pool, existed before Adam and Eve, and went extinct, either shortly before or after the creation of Adam and Eve. (Old-Earth model)

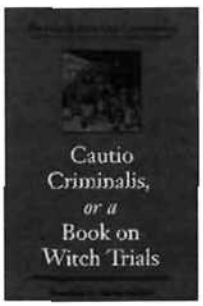
Here Ross appeals to a carefully chosen fossil to resolve a question steeped in religious assumptions. He conveniently avoids data supporting the relatedness of humans to other primates and hominid fossils. Having assumed they are separate creations, Ross indulges in wild speculations for why they exist at all:

> It seems reasonable that God anticipated the negative impact of (post-Fall) human activity on birds and mammals. One possible scenario is that in the time period prior to Adam and Eve's creation God made a sequence of bipedal primate species, each more skillful at hunting than the one before. Birds and mammals would then have developed better behavioral defenses against the future onslaught of humanity (p. 237).

This proposal sounds like the same "appearance of age" argument that Ross condemns elsewhere in the book. In cases where the Bible and science differ, such as the order of appearance of the Earth and stars, or birds and land animals, Ross proposes peculiar meanings for Genesis to make it harmonious with science. One reason he gives for accepting scientific evidence is to give Christianity respectability: "This refusal [by young-Earth creationists] to acknowledge established data causes many people to dismiss belief in creationism as either complete idiocy or downright deception" (p. 207). But he can't take this strategy to its logical conclusion without relinquishing his own cherished beliefs. I wonder how Ross would feel about predictions like these:

> Research will find no evidence of similarity between humans, apes, and fossil hominids to suggest a genealogical relationship. (Ross's creation model)
>
> Research will find extensive anatomical, biochemical, and behavioral similarities consistent with common ancestry. (Evolution model)

How should skeptics respond to Hugh Ross and his message? It's a complex issue. Given the perceived threat of young-Earth creationism, it is tempting to see Ross as an ally because of the special difficulties he poses for that movement. But isn't his brand of creationism just as troubling? I can respect any viewpoint that makes consistent use of well-stated assumptions and authorities (pure biblical creationism, for example), even if I don't accept those assumptions and authorities myself. It's the inconsistency and dishonesty that I find troubling about many creationists, and Ross is just one more example of this. He lets mainstream science be the highest authority on astronomical matters (bending the Bible to fit), but he ignores the most basic data in biology and appeals to fringe authorities in order to arrive at discredited conclusions, such as the separate creation of species. This makes him as arbitrary and dishonest as any young-Earth creationist he seeks to confound. In the end, Ross's shrewd criticisms of the young-Earth creationists can be easily turned on his own views, for his peculiar blend of Christianity and science is no more intuitive or harmonious than theirs is.



A Voice of Reason in the Midst of the European Witch Hunts

JAMES M. WOOD

Cautio Criminalis, or a Book on Witch Trials. By Friedrich Spee von Langenfeld. Translated and with an introduction by Marcus Hellyer. University of Virginia Press, 2003. ISBN 0-8139-2181-3. 288 pp. Hardcover, $49.50.

When the great European witch hunts were at their height, skepticism could be risky. Citing the biblical injunction "You shall not suffer a sorceress to live" (Exodus 22:18), most Catholic and Protestant theologians endorsed the punishment of individuals who had supposedly made pacts with the Devil. Anyone who questioned these persecutions risked being labeled as a heretic for opposing scripture and might even be accused of witchcraft. The penalties could include imprisonment or death at the stake.

Despite these dangers, a few intrepid skeptics of the sixteenth and seventeenth centuries spoke out. One was Johann Weyer, an internationally famous Rhineland physician who contended in his *De Praestigiis Daemonum* that the old women convicted as witches were suffering from mental disease or had been foolishly tricked by Satan into believing they had magical powers. A second dissenter was Reginald Scot, a learned English gentleman who derided belief in sorcery as ignorant superstition and wrote a debunking tract, *The Discoverie of Witchcraft,* that was ordered burned by the witch-hating King James I of England.

Torture can generate a vicious cycle of misinformation, as those who are tortured tell lies to satisfy their torturers, and the torturers in turn believe these lies because the falsehoods correspond so well with what the torturers expected to hear.

One of the most outspoken opponents of the witch hunts was also a deeply religious believer, the German priest Friedrich Spee, who had served as a prison chaplain to convicted witches before they were executed. Counseling these women as they awaited death by fire, Spee became convinced that, although all had admitted being witches during their trials, they were in fact innocent. "I will state under oath," declared Spee, "I have not yet led any woman to the stake who, with all things considered, I could prudently state was guilty." In *Cautio Criminalis,* published in 1631, this eloquent and passionate Jesuit directed his finely honed skills as a theologian and logician against the witch trials, which he attacked as contrary to established law, rationality, and Christian morality.

Originally written in Latin, Spee's book has been unavailable in English until recently, except for a few excerpts. Now, however, Marcus Hellyer, historian of science at Brandeis University, has produced a complete English translation of *Cautio Criminalis* with an introduction that provides historical background on Spee and the witch hunts. Published by the University of Virginia Press, Hellyer's translation will be of interest not only to scholars but also to general readers who are curious about one of the most disturbing episodes in the annals of Western civilization. Nearly four centuries after it was written, Spee's book is still impressive, at once a passionate outcry against the witch hunts and a clear-sighted appraisal of the political and legal factors that made them possible.

In analyses foreshadowing the conclusions of modern sociologists, Spee argued that the witch hunts started because of superstitions among the common people, but that the persecutions continued and spread because of lax legal procedures in the German courts. Specifically, Spee contended that in their zeal to root out the influence of Satan, witch-hunting judges routinely relied on uncorroborated rumors and statements extracted under torture—forms of evidence that, even in the 1600s, were recognized as unreliable. Spee saw clearly that when torture or the threat of it was used, then the accused witches would say whatever their questioners wanted to hear in order to avoid pain. Thus, the use of torture in the witch hunts guaranteed that there would be abundant "evidence" of evildoing and numerous "confessions" by

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women who had purportedly made pacts with the Devil. As Spee said, "The only reason we are not all sorcerers is that torture has not yet touched us."

Spee also understood that when supposed witches were tortured into naming their accomplices, they would inevitably implicate an ever-widening circle of innocent people. For instance, *Cautio Criminalis* tells the true story of a prince who sought the advice of a learned priest. What should be done, asked the prince, if ten different witches had all named a certain man as participating in their Satanic sabbaths? The priest replied that no mercy should be shown to the accused man, but that he should be instantly seized and put to death. I'm sorry to say that you have just condemned yourself, answered the prince, because fifteen different witches have all named you as participating in their evil ceremonies.

Spee's book can be read as a classic defense of due process—a reminder of what a legal system can be like without a Bill of Rights and protections against torture, self-incrimination, and secret trials. In recent years, since the 2001 attacks on the World Trade Center, some zealous individuals have argued that the U.S. government and its allies can forestall future attacks by using torture to extract information from suspected terrorists. A reading of *Cautio Criminalis* raises doubts about the practicality of such advice. As Spee well knew, torture can generate a vicious cycle of misinformation, as those who are tortured tell lies to satisfy their torturers, and the torturers in turn believe these lies because the falsehoods correspond so well with what the torturers expected to hear.

Spee was not only a moral theologian and priest but also a talented poet and song writer. His powers of expression are evident in *Cautio Criminalis*, which is exceptionally well written and eloquent, with many interesting anecdotes about the witch hunters and their victims. However, prospective readers should realize that the book is written in the style of a scholastic disputation, organized as a series of "questions," each followed by pro and con arguments, counter-arguments, and extended rebuttals. The medieval theologian Thomas Aquinas used the same style in his famous *Summa Theologica*. While this type of writing allows for a thorough and systematic presentation of arguments, at times it may strike modern readers as repetitive and tedious. Nevertheless, the new translation of *Cautio Criminalis* is generally fascinating and thought-provoking. This landmark text in the history of skepticism will be of interest to many readers because of the unexpected insights it provides into current affairs as well as the witch-hunts of four centuries ago. □

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Scientists and the Election

RALPH ESTLING

The great and good Studs Terkel used to ask himself one and only one question, always the same question, each time he interviewed a politician: "Why is this bastard lying to me?"

Politicians are of course world-renowned for their lack of known paternity, whereas scientists of course are famous for their scrupulous objectivity, broad and deep insights into all manner of things, and their mature approach to each and every problem they come across and yes, I am being ironic, but only halfway.

The recent American presidential election received more than its normal share of attention and comment from scientists, both domestic and foreign. Even that most portentous of scientific publications, *Nature*, pondered long and hard in print on the relative merits and lack of them of Messrs. Bush and Kerry. It seems safe to say that a large majority of scientists, both in America and out of it, were intensely pro-Kerry, or rather, anti-Bush. Here in Britain that was certainly so. And few scientists were shy about expressing their opinion wherever and whenever they could.

Science never is, was never meant to be, a democracy. Majority consensus cannot determine whether Earth revolves around the Sun or vice versa. Propositions on ballot papers will not *decide whether the extinction of the* dinosaurs was due to a bolide.

Scientists with a profound grasp of molecular biology, particle physics, the geology of the Upper Cretaceous, or other subjects had much to say on the comparative worth of the two candidates and there are two vital, if obvious, points I'd like to make on this, the first being that scientists, whether U.S. citizens or not, have every right to express their opinions on all subjects, including American presidential elections, publicly and, if they wish, vehemently; the second being that these opinions generally carry as much weight and as much knowledge of the facts as do the opinions presented by nonscientists.

As with almost everything, there are exceptions. The advice of the physicist Richard Feynman on a wide range of human endeavor, from the proper technique for picking up women in bars to the best ways to crack open a safe, was always trenchant. Stephen Gould's guidance on why hitters are unlikely ever again to end a season with a .400 batting average was extremely sound. Murray Gell-Mann can, and does, offer erudite enlightenment on most matters you can think of, even unasked. The point is not that gifted scientists are necessarily nerds and geeks; they generally are not. The point is that, once outside their field of expertise, most are no more knowledgeable, no more insightful, no more wise and perceptive than you or I. If, generally speaking, they lack the full measure of deceit, low cunning, and deep stupidity summed up by the German word *Biederkeit* (there being no English word equivalent to it), the quality so widely prevalent in politicians, theirs will probably still not be the last word on the subject of who and who not to elect

Our frequent columnist Ralph Estling writes from Ilminster, Somerset, England.

president. One must study politics and politicians for some time in order to understand, and one must know one's subject. Scientific experts in, say, quantum entanglement or the evolution of the shrimp do not hide their annoyance, any more than they hide their candle under a bushel, when mere laymen expound on these matters. Politics has its experts too, and they are rarely, if ever, scientists. There are very good reasons for this.

Part of the problem is that scientists deal in logical pursuits, often mathematical ones. This puts them at a disadvantage when attempting to deal with politics (and similarly, as has often been pointed out, with a magician's illusions and other tricks). Scientists approach politics and its cousin, magic, with reason and empirical observation as their guide and therefore are rarely in a position to grasp the essential nature of the unreasonable and nonempirical. When scientists turn their minds, as they have occasionally, to how the world should be run, the result is almost always either laughable or deplorable. Some scientifically and technocratically inclined souls have long advocated schemes and projects whereby nations or the world itself are governed on strictly logical, scientific principles—one thinks immediately of H.G. Wells, J.D. Bernal, J.B.S. Haldane, Julian Huxley, and a host of others who, like them, had Utopia all set out nicely and neatly on paper for all the world to see and marvel at. But the world, if it saw at all, never marveled. Scientifically sound Erewhons and Laputas, some dating back to Plato, have been laid out for all mankind to consider and embrace. But mankind has rarely seriously considered, let alone embraced, them. When Plato tried to put his own personal utopia into effect by teaching Dionysius II, the king of Syracuse, how to rule scientifically as a constitutional monarch, Plato only just escaped with his life.

It is evident that there is something in politics, magic, and their practitioners that does not sit lightly on the lap of science.

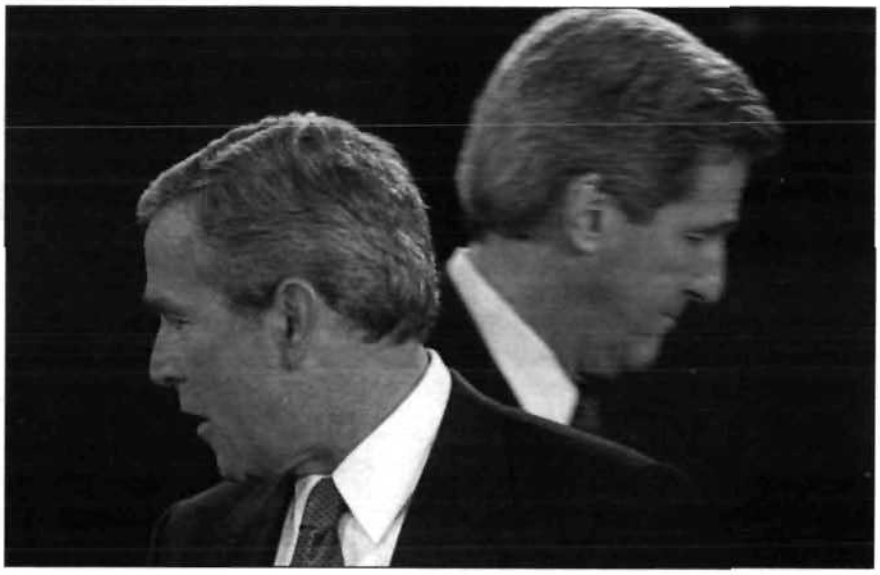

Photo credit: REUTERS/Jim Bourg.

Scientists will go on telling us how to live and how to vote, and they have every right to. But the world and its inhabitants will go their own messy, zigzaggy ways. The quality of *Biederkeit* is not strained. It droppeth as a very heavy lump of concrete upon one's foot. This is a shame because some scientists occasionally have important things to tell us, about what we are doing to this planet and why we had better stop and why stem-cell research might be a good thing.

But perhaps the real problem when it comes to scientists and politics is that we (most of us) are pleased to have our politics follow democratic procedures. Science never is, was never meant to be, a democracy. Majority consensus cannot determine whether Earth revolves around the Sun or vice versa. Propositions on ballot papers will not decide whether the extinction of the dinosaurs was due to a bolide. No referendum, no matter how assiduously drawn up and fairly argued, can settle once and for all whether string theory is worth pursuing or Darwinian natural selection is more likely than Intelligent Design. All of which is just as well.

And so we split the difference. Our politics is conducted, often very badly, through democratic means, our science by nondemocratic, scientific methods based on discernible facts and mathematical indications (I'm speaking in ideal terms). And if ever the twain shall meet, the results would be catastrophic—or at least not very pretty. I would hate to have creationism, that epitome of *Biederkeit*, versus evolution put to a free, democratic vote in many of the states of the United States, just as I visibly tremble at the thought of scientists governing the world or any portion of it. Politicians do a bad enough job; the thought of professional experts, whether in the hard sciences or in softer things like sociology and psychology, telling humankind how to function is too dreadful even for comment.

So we face the ugly prospect of a future that is like the past and present: politicians will, to a large and democratic extent, control scientists and much of what they do, and scientists will not control politicians or nations or the world. It is a daunting prospect. But not nearly as daunting as scientists set absolutely free to do whatever they like, in science or in running the world.

Dr. Strangelove is, mostly, a fictional character, as is Dr. Frankenstein. Each is a gross distortion of your typical scientific expert. But pause a moment and contemplate your typical scientific experts. And then ask yourself if you really would want them in charge of things.

I wonder what Studs Terkel would say.

Comforting Thoughts about Death That Have Nothing to Do with God

GRETA CHRISTINA

So here's the problem. If you don't believe in God or an afterlife; or if you believe that the existence of God or an afterlife are fundamentally unanswerable questions; or if you do believe in God or an afterlife but you accept that your belief is just that—a belief, something you believe rather than something you know—if any of that is true for you, then death can be an appalling thing to think about. Not just frightening, not just painful. It can be paralyzing. The fact that your life span is an infinitesimally tiny fragment in the life of the universe, that there is, at the very least, a strong possibility that when you die, you disappear completely and forever, and that in five hundred years nobody will remember you and in five billion years Earth will fall into the Sun—this can be a profound and defining truth about your existence that you reflexively repulse, that you flinch away from and refuse to accept or even think about, consistently pushing it to the back of your mind whenever it sneaks up for fear that if you allow it to sit in your mind even for a minute, it will swallow everything else. It can make everything you do, and everything anyone else does, seem meaningless, trivial to the point of absurdity. It can make you feel erased, wipe out joy, make your life seem like ashes in your hands. Those of us who are skeptics and doubters are sometimes dismissive of people who fervently hold beliefs they have no evidence for simply because they find them comforting—but when you're in the grip of this sort of existential despair, it can be hard to feel like you have anything but that handful of ashes to offer them in exchange.

Greta Christina has been a freelance writer since 1989. Her writing has appeared in anthologies, newspapers, and magazines, including both Ms. *and* Penthouse. *Her influential essay "Are We Having Sex Now or What?" has been cited by scholars and writers throughout the country. Her Web site is www.gretachristina.com. She lives in San Francisco.*

But here's the thing. I think it's possible to be an agnostic, or an atheist, or to have religious or spiritual beliefs that you don't have certainty about, and still feel okay about death. I think there are ways to look at death, ways to experience the deaths of other people and to contemplate our own, that allow us to feel the value of life without denying the finality of death. I can't make myself believe in things I don't actually believe—heaven, reincarnation, a greater divine plan for our lives—simply because believing those things would make death easier to accept. And I don't think I have to, or that anyone has to. I think there are ways to think about death that are comforting, that give peace and solace, that allow our lives to have meaning and even give us more of that meaning, and that have nothing whatsoever to do with any kind of God or any kind of afterlife.

Here's the first thing. The first thing is time, and the fact that we live in it. Our existence and experience are dependent on the passing of time and on change. No, not dependent—*dependent* is too weak a word. Time and change are integral to who we are, the foundation of our consciousness, and its warp and weft as well. I can't imagine what it would mean to be conscious without passing through time and being aware of it. There may be some form of existence outside time, some plane of being in which change and the passage of time is an illusion, but it certainly isn't ours.

And inherent in change is loss. The passing of time has loss and death woven into it: each new moment kills the moment before it, and its own death is implied by the moment that comes after. There is no way to exist in the world of change without accepting loss, if only the loss of a moment in time: the

way the sky looks right now, the motion of the air, the number of birds in the tree outside your window, the temperature, the placement of your body, the position of the people in the street. It's inherent in the nature of having moments—you never get to have this exact one again.

And a good thing, too. Because all the things that give life joy and meaning—music, conversation, eating, dancing, playing with children, reading, thinking, making love, all of it—are based on time passing, on change, and on the loss of an infinitude of moments passing through us and then behind us. Without loss and death, we don't get to have existence. We don't get to have Shakespeare, or sex, or five-spice chicken, without allowing their existence and our experience of them to come into being and then pass on. We don't get to listen to Louis Armstrong without letting the E-flat disappear and turn into a G. We don't get to watch *Groundhog Day* without letting each frame of it pass in front of us for a twenty-fourth of a second and then move on. We don't get to walk in the forest without walking by each tree and letting it pass behind us; we don't even get to stand still in the forest and gaze at one tree for hours without seeing the wind blow off a leaf, a bird break off a twig for its nest, the clouds moving behind it, each manifestation of the tree dying and a new one taking its place.

And we wouldn't want to have it if we could. The alternative would be time frozen, a single frame of the film, with nothing to precede it and nothing to come after. I don't think any of us would want that. And if we don't want that, if instead, we want the world of change, the world of music and talking and sex and whatnot, then it is worth our while to accept, and even love, the loss and the death that make it possible.

Here's the second thing. Imagine, for a moment, stepping away from time, the way you'd step back from a physical place, to get a better perspective on it. Imagine being outside of time, looking at all of it as a whole—history, the present, the future—the way the astronauts stepped back from Earth and saw it whole.

Keep that image in your mind. Like a timeline in a history class, but going infinitely forward and infinitely back. And now think of a life, a segment of that timeline, one that starts in, say, 1961, and ends in, say, 2037. Does that life go away when 2037 turns into 2038? Do the years 1961 through 2037 disappear from time simply because we move on from them and into a new time, any more than Chicago disappears when we leave it behind and go to California?

It does not. The time that you live in will always exist, even after you've passed out of it, just like Paris exists before you visit it and continues to exist after you leave. And the fact that people in the twenty-third century will probably never know you were alive . . . that doesn't make your life disappear, any more than Paris disappears if your cousin Ethel never sees it. Your segment on that timeline will always have been there. The fact of your death doesn't make the time that you were alive disappear.

And it doesn't make it meaningless. Yes, stepping back and contemplating all of time and space can be daunting, can make you feel tiny and trivial. And that perception isn't entirely inaccurate. It's true; the small slice of time that we have is no more important than the infinitude of time that came before we were born or the infinitude that will follow after we die.

But it's no less important either.

I don't know what happens when we die. I don't know if we come back in a different body, if we get to hover over time and space and view it in all its glory and splendor, if our souls dissolve into the world-soul the way our bodies dissolve into the ground, or if, as seems very likely, we simply disappear. I have no idea. And I don't know that it matters. What matters is that we get to be alive. We get to be conscious. We get to be connected with each other and with the world, and we get to be aware of that connection and to spend a few years mucking about in its possibilities. We get to have a slice of time and space that's ours. As it happened, we got the slice that has Beatles records and Thai restaurants and AIDS and the Internet. People who came before us got the slice that had horse-drawn carriages and whist and dysentery, or the one that had stone huts and Viking invasions and pigs in the yard. And the people who come after us will get the slice that has, I don't know, flying cars and soybean pies and identity chips in their brains. But our slice is no less important because it comes when it does, and it's no less important because we'll leave it someday. The fact that time will continue after we die does not negate the time that we are alive. We are alive now, and nothing can erase that. □

I don't know what happens when we die. And I don't know that it matters. What matters is that we get to be alive. We get to be conscious. We get to be connected with each other and with the world, and we get to be aware of that connection and to spend a few years mucking about in its possibilities.

The Bizarre Columbia University 'Miracle' Saga Continues

BRUCE L. FLAMM

Since publication of my investigative article "The Columbia University 'Miracle' Study: Flawed and Fraud" in the September/October 2004 SKEPTICAL INQUIRER there have been several significant developments.

You'll recall that this all started more than three years earlier, when *The New York Times* reported on October 2, 2001, that researchers at prestigious Columbia University Medical Center in New York had made an astonishing discovery: faith healing actually works. Physicians used meticulous scientific methods to demonstrate that distant Christian prayers from the United States, Canada, and Australia increased the success rate of infertility treatments in Korea by 100 percent.

The media touted the astounding results, but to some readers it sounded preposterous. Within weeks of the "miraculous" study's publication it became clear that something was indeed very wrong. The *Journal of Reproductive Medicine* (*JRM*), which published the study (K.Y. Cha, D.P. Wirth, and R.A. Lobo, "Does prayer influence the success of in vitro fertilization-embryo transfer?" 46:781–787, 2001), not only refused to publish letters critical of it, they refused to even acknowledge their receipt. As months went by the *JRM* steadfastly refused to respond to e-mails, calls, or letters about the study.

The *JRM* editors were not the only ones remaining silent. The study's authors also refused to respond to questions about their apparently miraculous results. In December 2001 an investigation of Columbia University by the U.S. Department of Health and Human Services (DHHS) revealed that the study's lead author, Dr. Rogerio Lobo, first learned of the study six to twelve months after the study was completed. Professor Lobo subsequently denied having anything to do with the study's design or conduct and claimed to have provided only editorial assistance. A year later study co-author Daniel Wirth was indicted by a federal grand jury on felony fraud charges involving various criminal activities.

The following significant events have occurred since my SI article was published. I comment accordingly.

Study co-author Daniel Wirth

On November 22, 2004, study co-author Daniel Wirth was sentenced to five years in prison followed by three years of supervised release (parole). At the conclusion of his sentencing hearing Mr. Wirth was taken into United States Marshal custody pending his transfer to a federal prison.

The *Journal of Reproductive Medicine* and co-author Dr. Kwang Cha

The following "Erratum" was buried on the very last page of the October 2004 issue of the *JRM*:

Erratum

In the article "Does Prayer Influence the Success of in Vitro Fertilization-Embryo Transfer? Report of a Masked, Randomized Trial," by Kwang Y.Cha, MD, Daniel P. Wirth, JD, MS, and Rogerio A. Lobo, MD (2001;46:781–787), Dr. Lobo is listed as an author of the article and has requested that his name be deleted, as his name appears **in error**. He was not directly involved in conducting the research reported in the article; he was involved principally in redaction of the manuscript for stylistic and syntactic purposes. This alteration is in keeping with *JRM* authorship requirements.

How does one's name appear, "in error" on a publication? Apparently everyone who reviewed the manuscript and everyone who reviewed the galley proofs, including the authors, peer-reviewers, and editors, did not notice this "error." On the other hand, perhaps this is not so surprising since these same individuals did not notice that the study lacked any type of informed consent and claimed results that defy the laws of physics and several other fundamental scientific principles!

In November 2004, after three years of ignoring letters critical of the Cha/Wirth/Lobo study, the *JRM* took

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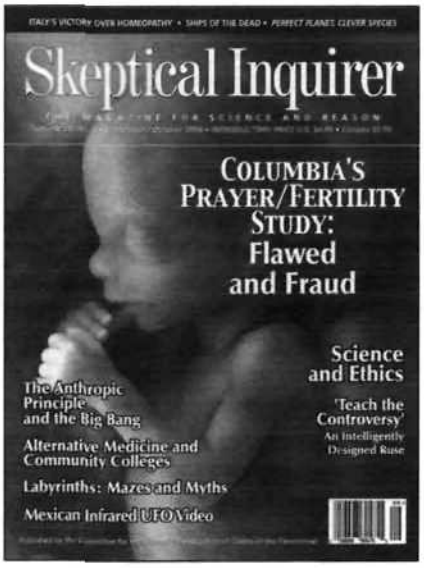
the unprecedented step of publishing a 1,000-word letter from Dr. Cha defending his absurd study. Thus, to the utter amazement of many readers, *JRM* allowed Dr. Cha to unilaterally present his side of the story unencumbered by critical comments from concerned physicians and scientists. The readers of *JRM* were thus partially informed of the controversy surrounding the study but only to convince them that any criticisms they may have read about in newspapers were unwarranted.

Among the highlights of Dr. Cha's published letter is the statement that "It is regrettable that co-author Daniel P. Wirth has been accused of fraud. . . ." Cha also refers to "this *alleged* crime." This implies that, regrettably, Mr. Wirth may have been falsely accused. Nothing could be further from the truth. Six months before Cha's letter was published Mr. Wirth had pleaded guilty to all crimes contained in a forty-six-page federal indictment thus admitting to a twenty-year history of criminal fraudulent activities. Dr. Cha went on to defend the study's convoluted study design by stating that Mr. Wirth felt it was the best design to use. This is nothing more than an argument from authority—"It's fine because the authority says it's fine." However, in this case the authority is a convicted felon with a degree in parapsychology (ghostbusting) and a long history of publishing bizarre studies!

Finally, Dr. Cha repeatedly stated that it would have been "impossible" for Mr. Wirth to have influenced the outcome of this study and that "There is no reason to think that Mr. Wirth would have been motivated not to organize prayer groups when such groups are his area of interest." How does the fact that Mr. Wirth has an interest in prayer groups prove that he did anything at all? The federal indictment makes it clear that Mr. Wirth was perpetrating several criminal schemes involving millions of dollars at the time the Cha/Wirth/Lobo study was *allegedly* conducted. In the midst of this criminal activity are we to believe that Mr. Wirth took the extensive time and effort needed to meticulously organize and manage several levels of prayer groups in three nations? Does Dr. Cha seriously believe that the idea that Mr. Wirth did not do so is impossible? Perhaps this explains why Dr. Cha will not answer questions about the study.

Individuals at Columbia University and the *JRM* have seriously damaged the reputation of science and evidence-based medicine.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Columbia University and co-author Dr. Rogerio Lobo

Soon after publication of the SI critique of the study, Columbia University assembled a team of physicians and scientists to investigate the situation. However, on December 1, 2004, Columbia released a statement saying that the medical school "supports Dr. Rogerio Lobo's decision to remove his name" from the paper. This move had already been announced by the *JRM* and seemed like a reasonable first step. However, to the surprise of many scientists, the university simultaneously announced that Dr. Lobo's decision would put an end to the investigation of the study by the medical school's Committee on the Conduct of Science. This unprecedented move implied that the controversy surrounding the ridiculous study involved only questions of authorship. This, of course, is absolutely not true. The real issue is that the study was absurd, flawed, possibly fraudulent, and claimed to document mysterious supernatural and/or paranormal events. Removing one author's name from the paper resolved nothing. In any case, this maneuver did not successfully distance Columbia from the scandal because co-author Kwang Cha was also at Columbia when the study was published; in fact, he was head of the now defunct Cha/Columbia Infertility Center.

In the final analysis it is not the behavior of Mr. Wirth but that of individuals at Columbia University and the *JRM* that have seriously damaged the reputation of science and evidence-based medicine. Peer-review systems at both institutions have completely failed. As we enter the fourth year of this saga it is becoming apparent that some individuals will never admit their mistakes. In any case, the former Cha/Wirth/Lobo miracle study is now the Cha/Wirth miracle study. Dr. Cha will not answer questions about the scandal and Mr. Wirth has just been sentenced to five years in federal prison. Their ludicrous "study" will remain in the peer-reviewed *Journal of Reproductive Medicine*, will remain indexed in Pubmed-MEDLINE, and will continue to be cited as valid scientific evidence for the power of supernatural faith healing. This is a scientific atrocity.

'Stupid Dino Tricks': A Reply to Hovind's Web Response

GREG MARTINEZ

In early December 2004, a response to my SKEPTICAL INQUIRER article "Stupid *Dino Tricks*" (*November/December* 2004), about my visit to creationist Kent Hovind's Dinosaur Adventure Land, was posted on Hovind's Web site. (The response, by Jonathan Sampson, can be read in its entirety at: www.drdino.com/QandA/index.jsp?varFolder=Critics&varPage=Skeptical_Inquirer.jsp.)

Readers might be justified in thinking that a response to it may be a fool's errand. However, amidst all the invective and misdirection there are instances when Sampson calls into question the fundamental accuracy and truthfulness of the article. Those require a reply.

After two paragraphs of tiresome boilerplate of how besieged Christians are in America, he accuses me of visiting the park "cowardly undercover." I attended the park like any other visitor would. I paid my admission fee, toured the grounds with the tour group, wandering off a few times but never sneaking anywhere. I was never asked why I was visiting. I was not asked to declare any religious affiliation. I was simply asked how many admissions I wished to purchase. My intention was to provide an honest, accurate picture of what any average visitor to the park would experience. This hardly constitutes a form of cowardice or being undercover.

Greg Martinez lives in Gainesville, Florida.

The same paragraph accuses me of being "less than truthful" regarding Hovind, the park's founder and builder. All statements regarding Mr. Hovind's interactions with the criminal and civil courts of Florida and Escambia County are a matter of public record and are available both at the county courthouse and on the Internet at the Clerk of the Court's Web site. All statements about Hovind's battle with the IRS were taken from media reports readily accessible on the Internet and from wire services. Hovind *was* arrested for assault on a parishioner. Hovind's home and office *were* raided by the IRS. Hovind *has* spent over two years and countless taxpayer dollars on a quixotic battle with Escambia County officials over a failure to pay a $50 fee. These are verifiable facts and their sources were listed in the article.

The fourth paragraph compounds a simple error by throwing insults, asserting that the boarded up buildings I witnessed along Old Palafox Road were in that condition because of Hurricane Ivan, which struck Pensacola on September 16, 2004. I visited the park in June 2004. Hurricane Ivan was not a factor in the long stream of boarded up businesses that line Old Palafox Road. The park stands out in its surroundings, and it merited the attention given it. Dinosaur Adventure Land (DAL) is surrounded by empty, abandoned commercial properties, many in disrepair. Its neighbors are a "buy-here-pay-here" used car dealership, auto repair shops, and a pawn shop. The owners and operators of DAL know this and are dishonest in this dodge, hiding behind the fig leaf of a natural disaster.

Interestingly, the next paragraph does not dispute the rather small number of visitors to the park as incorrect, but attempts to inflate the numbers as an example of a successful outreach. Sampson goes on to taunt: "How many students are educated everyday from SKEPTICAL INQUIRER?" While I am not sure of precise numbers, adding together the circulation of the magazine, the efforts of staff at CSICOP and the Center for Inquiry for education and outreach via television programs, media appearances, and so on, the number of people educated is considerable. However, I am certain of the number of visitors educated at DAL: zero. There is simply no education to be found at the park.

Sampson accuses me of launching *ad hominem* attacks against Hovind, trying to discredit creationism by discrediting Hovind and not directly addressing creationism's "science." He defends Hovind and creationism by posing a hypothetical: "Suppose an algebra teacher was convicted of theft and eventually sent to jail. Does that mean algebra is therefore disproved?" My brief biographical sketch of Hovind did not intend to discredit creationism by association. Creationism is a fiction no matter who its proponent. My intention was to provide a snapshot portrait of the scofflaw who built the park I went on to describe in great detail.

Sampson wrongfully accuses the magazine and myself of fraud, insisting that my description of the park is not true. He states: "Later, Martinez claims to have taken pictures of the Dinosaur Adventure Land grounds. Unsurprisingly he fails to include them in his article, but instead only prints an outdated picture of the early stages of DAL's creation museum building number 5. If Martinez included pictures of DAL grounds with the claims he's making, it would be all too clear that he's purposely painting an inaccurate portrait."

During my visit in June 2004, I took more than 115 digital and film photographs of Dinosaur Adventure Land. The SKEPTICAL INQUIRER chose to run only three of them due to space considerations, more than the number Sampson incorrectly states. The photograph of the Creation Museum Sampson attacks as outdated was taken in June 2004, along with all the other images in the article. The top photograph on page 48 is of the actual pamphlet travelers in Florida's Panhandle can pick up as an advertisement of the park. Their own advertisement depicts the "Fossil Dig" pit, the science center, the "Circle Swivel Springasaurus," and the "Dinosaur Hunt." All these are described accurately in the article.

Sampson is particularly exercised about my depiction of the tour guides at DAL. He states his pride in their ministering to the guests. Their quiet physical intimidation of guests at the park is more of a piece with the sales techniques of used car lots than the ministry. He also misses the point of the passage in which I describe eavesdropping on the conversation of a group of guides. He objected that I appeared to be mocking them for discussing scripture in a Christian park. The point I was making was that here were a group of young men, early in their adult lives, passing time by enthusiastically criticizing another branch of the Christian religion. It was difficult to reconcile all the earlier talk of Jesus and love with the "down-time" religious chauvinism I heard.

Sampson wraps up his indictment of my article by continuing to assert that it is a sloppy hatchet job that distorts the many valuable lessons DAL imparts to its visitors and lies about the contents of the park. He makes these claims despite the fact that he knows the descriptions are correct. He claims that a current and accurate photograph is outdated. He claims that the park's surroundings are in disrepair due to a hurricane when he knows that the deterioration of these buildings predate the storm.

He keeps up a steady drumbeat of mocking the piece because it does nothing to disprove creationism scientifically. That was never the intention. This magazine has published many other articles by some of the finest scientists in the world effectively demolishing creationism as the pseudoscience it is. It should have been obvious to most readers that this was intended as descriptive reporting, and done in an intentionally deadpan style so that the absurdity of the place would shine through. This piece was carefully researched, reported, and written, and I stand by every word of it.

Sampson perpetrates a shabby sham of a rebuttal to my piece, and distorts what the article actually states and reports. Sampson should have included a link to the actual article on the SKEPTICAL INQUIRER Web page so that his visitors could have read the article for themselves. But then Hovind and his Dinosaur Adventure Land have never been about accuracy and honesty. □

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Science, Ulcers, and Ostracism?

Thanks for the nice exposition of the ten-year sequence of events from the discovery of *H. pylori* to the adoption of new therapies for ulcer treatment ("Bacteria, Ulcers, and Ostracism? *H. Pylori* and the Making of a Myth," November/December 2004).

I can call to readers' attention a couple other examples, closer to my own specialty, that have reached almost mythic proportions. Alfred Wegener first proposed continental drift in 1912, but the hypothesis was not widely accepted until the early 1960s, or about half a century later. This has often been attributed to undue skepticism by "the establishment," but in fact, a substantial obstacle was obtaining absolute confirmation of the hypothesis, which required the technology to drill into the sea floor and date the rocks on either side of the spreading center, the Mid-Atlantic Ridge, and eventually to make global geodetic measurements accurate enough to actually observe the continental motions. Thus, in the case of continental drift, the long gestation of the hypothesis is as much (or more) due to the time until needed technology was developed to verify a prescient claim.

My second example is the Alvarez et al. hypothesis, published in 1980, that the dinosaurs met their end by a cosmic impact. Although initial reaction to the idea was highly skeptical among much of the geological community (less so among astronomers, who were more familiar with the impact phenomena), researchers in all relevant fields jumped on the hypothesis to do what they could to confirm, or reject, it. Confirming pieces of the puzzle came regularly to light, as in the case of *H. pylori* and its link to ulcers, but it took about ten years for solid, confirming evidence to fall into place, for example, the "smoking gun," the crater itself in the Yucatan Peninsula. This second example illustrates the point that it may be simplistic to speak of "the establishment" as a unified bloc. In the case of the impact hypothesis, most planetary astronomers, already familiar with the fact that major impacts occur, took an "of course" attitude in seeking confirmatory evidence, while many geologists, trained in the "uniformitarian" school of Charles Lyell, opposing catastrophic processes, tended to enter the fray skeptically. Nevertheless, they did enter the fray, so the Alvarez hypothesis was in no sense "ignored" by the mainstream, at any time or on either side of the issue. I think it is fair to say that ten years is about the minimum time necessary to subject a provocative new scientific hypothesis to rigorous tests to confirm it.

Alan W. Harris
Senior Research Scientist
Space Science Institute
La Canada, California

I'm afraid I'm going to have to take Dr. Kimball Atwood to task for taking Dr. Barry Marshall to task in his article in the November/December 2004 SI, specifically for Dr. Atwood's lack of understanding of how there did not need to be an elaborate conspiracy to suppress data by pharmaceutical companies or by the medical community for at least part of "the myth" to be true.

Dr. Atwood apparently underestimates the tremendous pressure put on the medical community by the pharmaceutical industry. In particular, the pressure placed on both family-practice physicians and gastroenterologists by an industry in its heyday, which stood to lose *billions* of dollars if the *H. pylori* theory became widely accepted too quickly.

I happened to be directly involved in the pharmaceutical industry in a sales capacity during the "ulcer wars" and can cite *ad nauseum* specific examples of the onslaught by representatives and corporate members of the industry. Quite frankly, the physicians never stood a chance. The mantra at the time was "no acid, no ulcer," and drug companies spared no expense, literally, to promote that message. The company I worked for at the time sold the only non-acid-suppressing drug for duodenal ulcers. Despite ulcer healing rates similar to the H2 antagonists, a side-effect profile that was benign by comparison, and better cost, our drug was buried by the H2s. No elaborate conspiracy necessary, just sheer numbers of people shouting you down.

I believe that the *H. pylori* "myth" of delayed acceptance is quite real, although the time frame would have differed by only a few years had the pharmaceutical industry not raised the volume so loud in its own sales message for the acid-suppressing drugs. Dr. Marshall deserves to be a "self-promoter" as Dr. Atwood calls him. He was David against many Goliaths, and I thank him for his dogged persistence and rationality.

Glenn McQuaig
Lititz, Pennsylvania

I liked Atwood's article on the acceptance of *H. pylori* as the cause of ulcers, but I object to his calling stress "bunk." We still have much evidence for stress as a cause. See Levenstein et al., "Stress and Peptic Ulcer Disease," *JAMA* 1999;281:10–11.

Atwood's opinion that ulcers are caused only by *H. pylori* or by taking NSAIDs has almost become gospel. The CDC says about ulcers, "none are caused by spicy foods or stress." However, before we all become converted, we should consider points muddying this simple explanation:

1. More than 80 percent of those infected with *H. pylori* do not have ulcers.
2. At least 10 percent of those with ulcers have no *H. pylori* infection.
3. Stress increases gastric-acid flow.
4. Ulcers increased dramatically after disasters such as the London blitz and the Kobe earthquake.
5. Anxious persons are much more prone to ulcers.
6. Persons scoring highest on a perceived stress scale were 2.9 times more likely to develop ulcers over the following thirteen years.
7. Family and job difficulties increase ulcers.
8. Psychological stress was correlated with recurring ulcers in those cured of *H. pylori* infection.
9. Ulcer patients have more life stressors than matched controls.
10. An ulcer group receiving stress-reduction training healed faster than a group receiving only conventional treatment.

H. pylori and NSAIDs are the main pieces of the ulcer puzzle. However, stress—which was once thought to be the main piece—is still a piece. Stress is not bunk.

Harold A. Scarbro
Las Vegas, Nevada

The article by Kimball C. Atwood found me an eager reader, since I had for over thirty years undergone several bouts of a peptic ulcer before "taking the cure" (antibiotics plus antacid). I first learned of the possible bacterial connection sometime in the 1980s when my mother gave me an article she had clipped from a copy of *Prevention* magazine (May 1987). I sort of ignored that article, since I was no longer going to a doctor when I had the ulcer attacks. I simply treated myself with milk to relieve the pain and a bland diet plus antacids. It was not until I read in an issue of *Scientific American* that *H. pylori* was considered a class 1 carcinogen that I decided to get further medical treatment.

Atwood's article presents good evidence that work on *H. pylori* was not ignored for more than ten years, and I learned a lot about modern medicine from the article. Still, there is a lapse of about fifty-four years from 1930 to 1984. Note, my date of 1930, not 1938, is not an error. I purchased a used book several years ago because of my personal interest in peptic ulcers. That book: *Peptic Ulcer: A Symposium of the Current Literature*, by the BiSoDol Company, New Haven, Connecticut, 1931.

The book gives references for two authors who, in 1930, published information in medical journals that implicated bacteria (not campylobacter or helicobacter) as a possible cause of ulcers. What was going on then for about fifty-four years? That's a long time. Isn't ignoring that evidence tacit ostracism?

Don't get the idea that I would advocate CAM—in fact, just the opposite. Certainly, claims such as "Therapeutic Touch" (see the same issue, page 6) and similar unsubstantiated treatments already have had more man-hours wasted on them than they deserve.

Donald F. Weitzel
Winnetka, California

Kimball Atwood will respond in the next issue.—EDS.

What Defines Science?

Surely Moldwin ("Why SETI Is Science and UFOlogy Is Not: A Space Science Perspective on Boundaries," November/December 2004) goes too far when he argues that it is the scientific establishment, and not the scientific method, that actually defines science, separating it from pseudoscience? Are researchers in closed societies or on classified government projects doing pseudoscience if they do not "publish in peer-reviewed scientific journals?" (Feynman would have been disappointed to hear it.)

Was my old high-school statistics class doing pseudoscience when it researched the strength differences between a person's strong hand and weak hand because the results were never "scrutinized and criticized by . . . scientific colleagues" in the field of handedness? (Many aspiring school-age scientists will be disappointed to hear it.)

If the SETI project ever finds an extraterrestrial intelligence, would that intelligence be considered never to have done science because its work had never "made it into scientific textbooks?"

Conversely, is any claim that is taken seriously by the scientific establishment necessarily not pseudoscience? Moldwin himself argues strongly against this when he mentions two "pseudoscientific" instances, memory water and intercessory prayer, where the scientific-establishment criteria have been met, at least so far, including publication in respected, peer-reviewed journals. The history of science is rife with such cases.

In general, doesn't Moldwin's article characterize science as the culture-based, old-boy-network-like, almost religious movement that its detractors sometimes claim it to be? Is Moldwin actually batting for the other side?

Richard A. Berg
Denver, Colorado

Mark Moldwin responds:

I thank Richard Berg for raising some good questions and the editors for the opportunity to elaborate on science, pseudoscience, and the spectrum of science. The issues raised by Berg can be best addressed by considering that there is not a dichotomy of either science or pseudoscience, but a spectrum of science. This spectrum has textbook science on one side and pseudoscience on the other. However, there are other "types" of science between these two extremes. An example of another type of science given in the original article was frontier science—new science that has not yet successfully stood the test of time or been tested by others. This isn't textbook science, but it can be science as opposed to pseudoscience (i.e., if it is done in such a way to allow others to verify and test the results).

Learning science (in a chemistry lab or statistics class) is also "doing" science, but usually not frontier science. Results from these exercises generally confirm known results and give students a chance to compare their experimental results to "the answer at the back of the book." Some science educators deride these "cookbook" labs as not "real" science, because they do not allow the students to experience "true discovery," but obviously, they are part of the science spectrum. I think many students are disappointed that they can't do "real" science in their classrooms—and that's why they are bored with science—and I applaud educators that expend the extra effort to provide real-discovery science opportunities for their students.

With regard to classified or unpublished science, though the practitioners may be "doing" science (not pseudoscience), they are not contributing to the canon of science. Publishing results (both positive and negative) was something that Feynman felt was a necessity. (See Feynman's essay on "Cargo Cult Science" in Surely You're Joking, Mr. Feynman.*)*

Instead of "characterizing science as the culture-based, old-boy-network-like, almost religious movement that its detractors sometimes claim it to be," I had hoped the article pointed out that a fundamental characteristic of science—which separates science from pseudoscience—is that scientists welcome testing of their results against reality. Peer review, the testing and examination of ideas by other scientists, is the hallmark of good science and by definition must be done in the broad community of scientists. Despite some problems with peer review—some bad ideas make it through, while other good ideas have a hard time—is there a better way for judging good science from bad science and frontier science from pseudoscience?

Science and the Public Curriculum

Austin Dacey, in "Science and the Public: Is Science Making Us More Ignorant" (November/December 2004), calls for a new interdisciplinary academic field to generate more public support for science. While this is commendable, I have my doubts that such an approach would curb the public's belief in pseudoscience.

As a science educator at both the secondary and college levels for thirty-eight years, it has been my experience that the reason traditional science education does not reduce beliefs in the paranormal is that it has failed miserably in addressing the fundamental epistemology of science, how scientists know what they know. Regrettably, the failure is often worse at the college level than in many secondary-school classrooms. Non-science majors are required to select a survey course that is a mile wide and an inch deep, and science majors must take several of them.

The theory of traditional science education that has persisted for more than a century is that if you give students enough pieces

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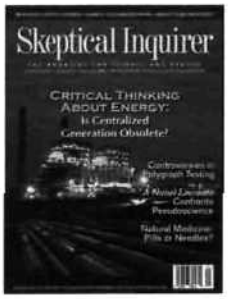

NOVEMBER/DECEMBER 2004 (vol. 28, no. 6): Bacteria, ulcers, and ostracism? *H. Pylori* and the making of a myth, *Atwood* / Science and the public, *Dacey* / Why SETI is science and UFOlogy is not, *Moldwin* / Blind spots, brain maps, and backaches, *Hall* / Stupid dino tricks, *Martinez* / Explaining the plagues of Egypt, *Lee* / Special Report: Senate Intelligence Committee highlights need for skeptical inquiry, *Radford* / Rorschach icons, *Nickell*.

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of the big puzzle, they will be able to complete the picture themselves and will have an "aha" moment about the nature of science.

This is a dangerous assumption. Students need to *do* properly controlled and appropriately blinded experiments. They need to be able to recognize poorly constructed experiments and unsupported results. They need to *experience* how scientists know what they know. In short, they need to *be* scientists.

The new curriculum Dacey proposes may be all well and good, but to use a football simile, you might get new fans to the game without them having a clue as to what is happening on the field. Science is not a spectator sport.

Gary Barker
Aurora, Colorado

Perhaps you and SI's readers would like to know of progress in a multidisciplinary academic field devoted to science and the public. Since about 1970, Stanford University has provided such a program. It has evolved from "Science, Technology, and Society" through "Values, Technology, and Society" (VTS) to "Values, Technology, Science, and Society" (VTSS), currently. I hope and trust it still exists (I retired from Stanford's support staff ten years ago).

I give this background to tell you about an unusual and informative book that is a product of this program. It is *Science, Technology, and Society*, by Robert E. McGinn, published in 1991. I recommend it to you.

Margaret Gelatt
Ashland, Oregon

Dinosaurs and Degrees

In your excellent article on Kent Hovind's Dinosaur Adventure Land (www.csicop.org/si/2004-11/hovind.html), you refer to Mr. Hovind as "a former public-school science teacher." I believe that either you have more information than I've been able to find, or you are overstating his credentials.

I can find no evidence or even a claim that Hovind ever taught in a "public" school, and I think the evidence is very weak that he was ever a real teacher of any kind.

Although he repeatedly refers to having spent "fifteen years teaching science," I haven't been able to find *any* details either from him or anyone else.

In another interview (www.blessedquietness.com/journal/housechu/hovind.htm), Hovind refers to fifteen years teaching in "Christian schools." "While I taught math and science in Christian schools for the next fifteen years I took courses at several Bible colleges in my spare time."

However, in an article written by Hovind himself (www.drdino.com/QandA/index.jsp?varFolder=Bible&varPage=TheBaptistsandtheAmish.jsp), he makes *no* reference to teaching school at all, but states that he "pastored an independent Baptist Church and started an independent Baptist Christian school." Again, I can't find anywhere where he gives names to either the church or the school.

If you check the dates, you'll find that these descriptions cover exactly the same time period.

Eric Prebys
prebys@fnal.gov

Thank you for another great issue. I read with interest your article on Kent Hovind's "theme park" of Creation Science versus the "religion" of science he has been pushing for years.

Not to pile on a nut once he's cracked, but I was surprised to see that you didn't mention in your article anything about Kent Hovind's dubious doctorate. He purchased his Ph.D. from a well-known diploma mill in Colorado, the Patriot University.

He is so sure that he is right that he doesn't see anything wrong with forging his credentials to help prove his radical (or looney—take your pick) view of the world.

He is that perplexing combination of both ignorance and arrogance. It would be funny if it weren't for those young robots he has programmed to run his tours.

Keep up the good fight.

J.C. Lindsay
Calgary, Alberta
Canada

I just read the article on the "Dinosaur Adventure Land" theme park, and had it not been in your publication, I would have dismissed it out of hand as a hoax. Are you sure this isn't like the infamous "Creation Science Fair?"

Things like this remind me of a quote I read on the Internet the other day: "Evolution is a theory like fat guys having sweaty backs is a theory." Thanks for giving me something to laugh at.

Henry Grimmelsman
Cincinnati, Ohio

See author Greg Martinez's Follow-up on page 54.

Plagues of Egypt?

Jeffrey Lee ("Explaining the Plagues of Egypt," November/December 2004) does a good job of explaining that many stories in the Bible derive from some real events and that the ten plagues may have plausible causes. However, he doesn't go far enough. The origin of the plagues has been well studied by biblical scholars, and we can get closer to what may have happened.

Most biblical scholars accept the theory that the Bible is composed of several intertwined strands called the J, E, P, and D books. The ten plagues, however, are never mentioned all together in any one of these strands, but cross both the E and P books, as given in table 1.

The E book mentions only eight plagues and the P book only six. As stories were passed down over many years, it is likely that the E plague of mosquitoes and the P plague of lice or gnats could have been the same event. Similarly, E plague 5 and P plague 6 also could have been the same. In addition, the term "first born" in plague 10 may have referred to the "chosen youth" or "prime youth" and not necessarily the eldest child. With this interpretation, we can hypothesize a possible, somewhat extreme, annual scenario causing these eight events, as given in table 2.

The Santorini volcano theory of the plagues, mentioned by Lee, however, has been largely discounted. Egypt was too far away for a volcano to have much of an effect. However, a volcano may play a role in the story in another important way. The description of the Israelites crossing the desert says that they are following God as a "pillar of cloud by day and a pillar of fire by night" (Exodus 13:21). This evokes the image of an erupting volcano. So one theory is that the original Yahwists (of the J book) were pagan volcano worshippers who originally lived in the volcanic region of Turkey or Crete (e.g.,

Table 1. Ten Plagues

E source	P source
1. Red Nile	
2. Frogs	
4. Mosquitoes or flies	3. Lice (gnats)
5. Cattle died	6. Boils on man and cattle
7. Hail	
8. Locust	
9. Darkness	
10. Death of first born	

Table 2. Cause of plagues

Plague	Cause
Red Nile	Minute organisms before annual flood in summer, as described by Lee
Frogs	After *annual flood of* Nile, frogs feasted on microorganisms and thrived
Mosquitoes or flies	After flood subsides, stagnant pools form and flies thrive on dead fish
Cattle died	Result of too many mosquitoes and disease
Hail	Could be a late-autumn weather phenomenon
Locust	Could also be late-autumn phenomenon
Darkness	Fits description of sandstorms between March and May or a heavy swarm of locust could also make sky appear dark
Death of prime youth	This is a result of the death caused by previous *plagues*

the Santorini Volcano?) and moved south to Canaan or Egypt and became part of the Israelite culture hundreds of years before the incident of the plagues.

Of course, as Lee states, this is all speculative. We don't really know. All we can say is *that there could be a natural explanation to* account for this gripping story in the Bible.

Marvin Zelkowitz
Department of Computer Science
University of Maryland
College Park, Maryland
(President of the National Capital Area Skeptics, Washington, D.C.)

Why does Jeffrey Lee assume that "the plagues" described in Exodus ever occurred? Exodus is a part of the Israelite origin saga that was created by generations of storytellers beginning long before Hebrew became a written language in the 900s B.C. Centuries passed between the presumed "time of Moses" (if such a person ever existed) and when the stories were written. The tales found here are similar to those in Genesis, and they have about the same likelihood of being factual as does the Garden of Eden story or that of Noah's flood.

Lee's apparent assumption that the ancient books of religious mythology have some sort of historical validity is quite disturbing. The article is "skeptical," but only after false premises have been accepted.

Brant Abrahamson
Brookfield, Illinois

I'd like to recommend that Jeffrey Lee dig deeper and consider whether the ten plagues of Egypt happened at all.

The list of plagues in Exodus is completely disjuncted with the list of plagues "predicted" in Isaiah. For those of us familiar with the way legends evolve and diversify while frequently revisiting common themes, the plagues and parting of the sea and the exodus all fit squarely into typical kinds of folklore. In this case, the overarching theme is "underdog wins and saves the day," the same as in David and Goliath among other tales.

Occam's razor does indeed have something to say about the plagues of Egypt, and that's that they're "heartwarming" stories featuring the protagonists as underdog and the most advanced and powerful empire-building civilization of the era as the overcome adversary.

Assuming that they relate a true story is unnecessarily multiplying entities.

Matthew H. Fields
Ann Arbor, Michigan

My skeptical sense suddenly came to life when I read "Explaining the Plagues of Egypt." Just why, I wondered, did the plagues come to the nice round number of ten and not four or seven, perhaps? Just too even and pat a number. And what *is* a plague of frogs? That would just be a nuisance.

To this skeptic, it looks this way: The Exodus grudge-writer patched together a story from various epidemics and epizootics that were endemic in the Middle East. He knew that they had happened, some in his lifetime, some earlier. He then lined them all up together and threw in a slap at the Egyptians so he could get a nice ten. Of course, it never happened that way, but it looks nice to have ten plagues lined up in a row.

George Rowell
New York, New York

Truly skeptical inquiry would begin by differentiating between mythology and history rather than by developing theories that assume that the mythological events took place. Having no evidence that the stories of Exodus, including the plagues, actually happened, why speculate about physical explanations?

Reasonable explanations are found within the mythology itself, which describes the power of the single god of the Hebrews, Yahweh, who defeats the many gods of the Egyptians. Each plague is an attack on a specific Egyptian god, including Pharaoh.

The religious truth would have been easily recognized by the people of the day: Yahweh is one bad-assed god. They probably understood the difference between legend and fact just as we understand the difference between a movie and real life.

Joel R. Finkel
Chicago, Illinois

I was somewhat surprised reading about the plagues of Egypt. Does Jeffrey A. Lee really believe that such things have ever happened?

I thought it to be common knowledge in skeptical circles that the Old Testament, like the tales of Jesus, is like Harry Potter, a fantasy.

Hans Bredahl
Gundsølille
Denmark

Jeff Lee responds:

I thank the letter writers for their insights on the plagues of Egypt, but the fact is that I have no clue as to whether or not there is an historical basis for this story in Exodus. The second sentence of my article is: "But this is not a discussion of plagues or of religion; instead it is about scholarship and how it is done when there is a dearth of evidence on a particular topic." I used the plagues studies as examples of critical thinking in scholarship.

Iraq, Intelligence, and Skepticism

In the second paragraph of his Special Report, "Senate Intelligence Committee Highlights Need for Skeptical Inquiry" (November/December 2004), Benjamin Radford states, "It is possible that, had the principles espoused by CSICOP been practiced by the intelligence community our country might have avoided a controversial and costly war." I would like to analyze that statement a little more, before I would even remotely accept it.

The arguments in the article use a number of selected statements from the Senate I.C. report to bolster Radford's rather

far-reaching proposition. The gist appears to assert that the intelligence community should have taken an "attitude of doubt or a disposition of incredulity (disbelief)" toward particular intelligence messages.

The circumstances of the period before the Iraqi war were pretty well cast in strong opposition to the Saddam Hussein regime. An eight-year history of deception regarding weapons inspectors, an attempt to murder a U.S. president, a continuing lack of full cooperation with U.N. inspectors during 1999–2002 (according to Hans Blix), and a twenty-plus-year ruthless reign with chemical WMDs over many Iraqis who did not agree with Hussein—the atmosphere was hardly one of being doubtful of Iraq's intentions. This must have played a significant role in the assessment of intelligence reports and was aided perhaps by (strong, right or wrong) political pressure from our government. To be cold-bloodly skeptical whenever a message confirming the intentions of a hostile regime comes across an agent's desk must have been very difficult indeed. One can argue that a true professional in the field is supposed to act that way, but let us not forget that they are human.

Radford's article is very persuasive, indeed, but it left me with the thought of "sauce for the goose is sauce for the gander." Should I believe every conclusion by the Senate I.C. as gospel? As deceptive as Saddam Hussein was, could he not have either destroyed or hid in impossible to find places certain evidence he did not want anybody ever to see? After all, why would he *not* pursue a program to develop WMDs? He hated the Israelis and knew full well their nuclear capability. He has been described as having region-wide ambitions to become the undisputed leader of the Middle East. Without WMDs and with a fairly poorly equipped military, that would have been so much more difficult.

It appears to me that even the most skeptical attitude among the intelligence community may not have avoided this costly war. That severe mistakes were made in the preparations towards and conduct of this conflict is patently obvious, as we have been hearing now for a very long time. However, that is a different issue.

Henri Suyderhoud
Naples, Florida

I concur with Benjamin Radford that groupthink led U.S. leaders to the erroneous conclusion that Iraq had WMDs, but I would remind readers that groupthink has been a recurring problem in American presidential decision making. Irving Janis has documented how groupthink led John F. Kennedy and his cabinet to adopt a CIA plan to invade Cuba in the Bay of Pigs fiasco. Groupthink characterized the thinking of Lyndon Johnson and his cabinet when they decided to escalate the war in Vietnam despite advice from many intelligence experts, UN leaders, allies, and influential Americans.

Groupthink in the decision to invade Iraq has extended further than in either the Bay of Pigs fiasco when the decision was made internally within Kennedy's cabinet or in the decision for escalation in Vietnam, a war that had already been authorized. In the Iraq decision, however, congressional approval was politically expedient. As the effects of groupthink spread through Congress, many members failed to be skeptical of the weak evidence for WMDs that was in the process of being discredited by State Department analysts. As pressure built to appear supportive of what was said to be part of the war on terror, many of the more skeptical members caved and then voted to give the administration authority to go to war before the evidence could be fully examined.

D. Alan Bensley
Department of Psychology
Frostburg State University
Frostburg, Maryland

There is little doubt in my mind that if Saddam Hussein had, in fact, been in possession of WMDs, he would still be in power now. All he would have to have done would have been to give them up. There would then have been no invasion. Unfortunately for Saddam, he did not possess any.

It is hard to believe that America did not know this. Why else would they ask for the sort of proof that no good skeptic would ask for, i.e., to prove a negative. Hussein could no more prove he didn't have them than I could prove Santa Claus doesn't exist.

The lesson from this for any dictator seems clear. Get yourself some WMDs. Then you can give them up, stay in power, and be the darling of the West—like General Gadaffi.

Mike Mason
Preston
United Kingdom

Climate Controversy

In a review of a June 15 meeting on climate change in Washington, D.C., whose sponsors included the American Association for the Advancement of Science, Environmental Defense, and the Turner Foundation (Doubt and About, November/December 2004), Chris Mooney wrote: "None of the so-called climate change 'skeptics'—Fred Singer of the Science and Environmental Policy Project, the Cato Institute's Patrick Michaels, and others—presented their views at this event." After providing no details describing my position on climate change in the succeeding three sentences, Mooney then wrote: "But few of these 'skeptics' have been publishing very much lately in the peer reviewed scientific literature."

This is a blatant attempt to damage my reputation. CSICOP cannot hide behind the rhetorical device of the word *few*, or what the word *these* means; the intent is obvious to any reader; indeed, this is the type of imprecise language that SKEPTICAL INQUIRER regularly rails against.

I have eight, and possibly nine (depending upon a printing schedule) publications in the refereed scientific literature in 2003 and 2004. One of them, on heat-related death rates in urban areas related to warming temperatures, was awarded the climate "Paper of the Year" by the Association of American Geographers. That record is as good or better than any of the presenters at the Washington meeting.

Also, as to the matter of affiliation, many academics are associated with honorary positions at think tanks, as am I. Mooney knows full well that I am Professor of Environmental Sciences at University of Virginia and State Climatologist for Virginia, positions I have held for twenty-three years.

When I first drew this to CSICOP's attention, they asked for a list of my recent publications. They shot first and asked questions later. Now they can publicly apologize.

Patrick J. Michaels
Professor of Environmental Sciences, University of Virginia
State Climatologist for Virginia
Senior Fellow, the Cato Institute
Charlottesville, Virginia

Chris Mooney lays out all the reasons why consensus should rule over skepticism, which seems odd in your magazine.

While the consensus regarding anthropogenic global warming is clearly supported

by the evidence of a changing climate and a changing atmospheric composition, a true skeptic still questions the strength of our understanding of the causal link that the consensus accepts. The problem, of course, is that there are limits to our ability to understand and quantify the myriad influences and feedbacks on this planet. There is even question about whether any human action at this point would change the outcome of our influence to date.

The far more fundamental problem (outside the scope of the skeptic or scientist) is whether humanity is prepared socially or economically to take any significant action to reverse the impact we have already had.

Morgan Rodwell
Calgary, Alberta
Canada

I was very disappointed that a skeptical magazine would publish the column "A Call for Attention to Climate Change," which endorses a position in which there is no consensus. There is a consensus that humanity's increase of carbon dioxide in the atmosphere is a contributing factor to global warming, but the degree of warming is in question. Some climatologists believe there will be no serious repercussions from this warming, in fact, there will be a beneficial influence in more vegetation.

The reason some climatologists paint such a sensational scenario is to get funding. In the admission of Stanford University's Stephen Schneider, ". . . we have to get some broad-based public support to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have."

The reason why the peer-reviewed journals print mostly the sensational scenarios and little of the skeptical viewpoint is that they depend on the same government funds. Presenting a position that does not present the alarmist position is not likely to get much government funding.

Herb Schaffler
Channelview, Texas

Fake Photo Foolery

In the Psychic Vibrations column in the November/December 2004 issue, you referred to a Bangladeshi news agency reporting the discovery of a "giant human skeleton" in Saudi Arabia. This struck me as familiar, and upon loading up the article, I discovered why. The photograph presented was created as part of a contest for the Web site Worth1000.com, which features many such manipulated images. (The actual title of the particular contest was Archeological Anomalies 2, for those who care.)

The "original" skeleton image, along with the skeleton of Fred Flintstone and a prehistoric Starbucks billboard, can be found at www.worth1000.com/cache/contest/contestcache.asp?contest_id=447&display=photoshop#entries.

Leo Tokarski
Kentwood, Michigan

Robert Sheaffer responds:

That is hilarious! I figured that the Bangladeshis probably made their own fake photo, but they didn't even bother to do that!

The Nature of Fictional Truth

In his Forum article of November/December 2004, Ralph Estling brings up the interesting dichotomy of factual truth vs. fictional truth. He regards Joe Rosenthal's Iwo Jima flag-raising photo and MacArthur's pictured landing at Leyte as examples of the latter. He then proposes that Sergei Eisenstein's baby carriage bouncing down the Odessa Steps and the director's depiction of "grizzled" revolutionaries listening to Lenin's speech at the Finland Station as being essentially the same variety of deception.

I disagree with the comparison. I can remember the first appearance of the Iwo Jima photo. I'm not sure it was touted as being, in fact, a portrait of the first raising of the flag on the island, but no one to my knowledge denied it at that time. A reasonably intelligent person—as I think I was even back then—might therefore have been quite likely to accept it as being exactly what it appeared to be.

And, as for MacArthur getting his trouser legs wet as he "returned" to the Philippines, neither I nor my crewmates in a carrier in those waters thought to question that photo was anything but what it purported to be—the general as the first man ashore. Later, I did wonder who had taken the picture, but my skepticism yielded to various rationalizations—though it never went so far as to accept it as a captured Japanese photo.

In short, the Eisenstein movies made no claim to being an actual record of revolutionary events, and even the most committed Leninist/Stalinist of that day would not have thought they were. No rational person would have believed a cameraman caught a baby buggy as it careened down the steps on that fateful day. No one could have assumed Sergei was so fortunate as to have captured the actual Finland Station scene on film. Nor did even *Pravda* claim detailed factual truth for Eisenstein's portrayals.

And there is the crux of the matter. The photos were deceptive portrayals of historic facts, while the films were dramatic presentations of historic events, with no more pretense to item-by-item accuracy than Shakespeare would have claimed for his *Henry V.*

So, the test of a fictional truth is twofold:

1. Are there false claims regarding the factual accuracy of presented materials?
2. Would a reasonably intelligent individual be likely to fall for the deception?

Unless *both* criteria are met, fictional truth is simply not the issue.

John A. Broussard
Kamuela, Hawaii

Ralph Estling's fine column in your recent issue on his spousal differences over "inspirational" deviations from "real" truth omits a third corner on "real" truth estimates. It can be, in some situations, temporarily at least, brutal and inhumane.

There's a story that the German philosopher Fichte, a hard-nosed and inflexible defender of "real" truth, was asked what he would tell a very ill wife whose only hope hung on the thread of her own hope's continuance. "If the truth," he said, "will kill her, let her die." What an ass! What a desensitized, ideology-bound ass, dehumanized by his philosophical and theological entanglements!

My sympathies for an "inspirational" version of the flag-raising on Mount Suribachi or of Doug's wet-footed "I have returned" are not well developed. I'm a Pacific veteran of WWII, and I like "real," "factual" truth. But what the hell! I think I'm on Estling's wife's side: a little bit of "inspirational" truth has its place now and then. It's the jut-jawed and often cruel insistence on "real" truth when kindness calls for mendacity that needs kicking around.

Robert M. Hermann
Marion Center, Pennsylvania

Ralph Estling, in his Forum column, is absolutely right: truth matters. Unfortunately, his example of General MacArthur's landing on Leyte perpetuates MacArthur's detractors' great exaggeration of the photo event. Estling says flatly that the landing "was shot three or four times before the cameramen got it right, in General MacArthur's carefully considered judgment." No source was given.

Since "truth matters," I went to the book, *Para(graph) Trooper for MacArthur*, by Joe Snyder (Leawood, Kansas: Leathers Publishing, 1997), who was assigned to MacArthur's headquarters as a press-liaison officer assisting war correspondents. (Joe Snyder later became editor and publisher of award-winning newspapers in Kansas and Missouri.)

Here is the description in Joe Snyder's book (page 100) of MacArthur's famous landing:

> He came ashore with senior commanders and the new Philippines president, Sergio Osmena. The general waded ashore, even though he could have waited a few moments and then easily stepped over the boat ramp without getting his feet and pant legs so thoroughly soaked. On the other hand, he'd been waiting to set his feet on Philippine soil for a long time.
>
> Pictures and newsreels (remember newsreels?) of the general wading ashore became so famous that some of his detractors thought the whole thing was staged. It was not staged. What was planned, however, was a convenient microphone and transmission system installed on the beach. Once ashore, he strode to the microphone in his freshly-pressed uniform ignoring the dripping pant legs, wearing sunglasses and a cap. After a dramatic pause, he said: "People of the Philippines, I have returned! By the Grace of Almighty God, our forces stand again on Philippine soil."

Just to make double sure, I e-mailed Joe Snyder and asked if the landing photos were shot "three or four times" and with MacArthur's making sure "they got it right," as Ralph Estling wrote. Joe Snyder replied on October 26, 2004:

> I don't recall anything extra special about his wading ashore there. I and the reporters and photographers were ahead of him so they could catch the glory of the moment, so to speak. He might have "showed off" a bit. It was a moment he had been waiting for since being driven out of the Philippines and he could have been asked to "return" a second time for those photo guys who might have wanted a second shot. The biggest story about Mac's landings took place on Morotai Island when the engineers misjudged the depth of the water as he stepped off the launch from the command ship and, rather than a few inches of water over his feet, [he] plunged in almost up to his shoulders and had to be assisted to shore. All of us got a kick out of that!

From my own fifty years of reporting experience, I have seen photographers at hundreds of events ask famous and "important" people for "one more shot." And most subjects kindly help the photographers. Which is most likely what happened at Leyte, as Joe Snyder says. I'm sure that if war photographers asked for "one more picture," MacArthur would have complied.

So let's not have SKEPTICAL INQUIRER, of all publications, perpetuating a myth of MacArthur's repeating the scene "three or four times" so the photographers "got it right in General MacArthur's carefully considered judgment." Truth matters.

Robert Skole
Boston, Massachusetts

Ralph Estling is being a bit sloppy to say the raising of the flag on Iwo Jima was "filmed by a war photographer whose name I have forgotten." Finding the name on the Internet would have taken seconds. The raising was indeed filmed, but it was the still photograph by Joe Rosenthal that caught the public imagination, became one of the most famous and most frequently reproduced ever taken, and formed the basis for the statue near Arlington National Cemetery.

There was an earlier raising which, contrary to what Estling says, was photographed, but not by Rosenthal, who wasn't there. However, he spent a lot of time denying that this meant his famous picture was posed or in some way created, rather than simply showing what happened, and it is sad to see Estling repeating the story. It is not true that anyone asked for the flag to be lowered and raised again so that it could be photographed. A decision was made to replace the first flag with another; Rosenthal photographed this second raising, then took a "gung ho" posed picture of Marines with the flag. He sent the film to be developed, and when he got a message praising the flag-raising picture and asking if it was posed, thinking it referred to the "gung ho" picture, he said yes. It should in any case be obvious that such a picture could not have been posed.

Ray Ward
London
United Kingdom

I agree with Ralph Estling that the actual, as opposed to the fictional, matters. So I was surprised that he presented as fact what is in reality a fiction: the claim that the flag raising on Iwo Jima depicted in the famous World War II photo was staged at the prompting of the photographer.

It's true that Associated Press photographer Joe Rosenthal missed the raising of the first American flag atop Mount Suribachi. Before Rosenthal climbed Suribachi, the officer in charge told his men to take the flag down for safekeeping and replace it with a larger flag that would be more readily seen by the Marines on the beaches below. It was this second flag raising that was captured on film. It was not done at Rosenthal's request and the photo was never presented as anything but a depiction of the second flag raising.

The "staged-photo" legend has often been debunked. See, for example, *Visions of War: Picturing Warfare from the Stone Age to the Cyber Age*, by David D. Perlmutter. For a detailed account of the flag raisings, see *Flags of Our Fathers: Heroes of Iwo Jima*, by James Bradley and Ron Powers.

Jack Wittman
Burke, Virginia

Ralph Estling responds:

My thanks for the above. It is always a pleasure to deal with people who are in total and certain possession of the truth.

1. Mr. Skole quotes a former press-liaison officer at General MacArthur's headquarters who writes that MacArthur "might have 'showed off' a bit" during "the glory of the moment, so to speak" and "he could have been asked to 'return' a second time for the photo guys." This is entirely possible. It is not what I have read over the years.

2. Mr. Wittman assures us that the "staged-photo legend" at Iwo Jima has often been debunked and lists some debunkers. He could be right in his rendition of the events. But I have read other, differing accounts.

3. Mr. Ward thinks I ought to have checked the Internet in order to get my facts right. Alas, I am not online.

More to the point, and I am slightly embarrassed at having to state the following: It is a fact that "facts," even those printed on the Internet, in history books, in original-source documents, in newspapers, and, sadly, eyewitness accounts, personal memoirs, and autobiographies are not necessarily the whole, unvarnished truth. Spin doctoring goes back a long, long way, at least to the Neolithic, and probably beyond.

I have reported the "facts" such as I believe them to be from my own reading of history. Perhaps I've read the wrong books. I must admit to being not nearly so sure I possess all the truth as the gentlemen above appear to be. Perhaps other readers possess other facts about these things and would like to add to our knowledge of the truth by giving their own personal renditions of it.

False Pretenses

Regarding "Fortuneteller Allowed at Fair Despite Law" (News & Comment, November/December 2004), the recent arrest of a Detroit psychic may be of interest. The charge was receiving money under false pretenses.

A client paid this psychic to cleanse his aura. The pretenses are that people have auras which require cleansing and that psychics can do so.

This caused me to wonder: People attend churches, to which they give monetary offerings, to have their souls cleansed. The pretenses are that people have souls which require cleansing, and that churches can do so.

Has any church ever been charged with receiving money under false pretenses?

William S. Bunn
Algonac, Michigan

Capital Punishment Responses

I read with pleasure Ted Goertzel's article, "Capital Punishment and Homicide: Sociological Realities and Econometric Illusions," in the July/August 2004 SKEPTICAL INQUIRER, not because of any opinions I hold on the issue of capital punishment, but rather because of the author's willingness to tackle an important issue in statistical analysis and get the right answer.

I was, therefore, mildly shocked by the response this article received in the Letters to the Editor (November/December 2004). Outside of the comments that simply weighed in on the issue of capital punishment, which was clearly not the point of the article, I was surprised to see so many letters struggling with the concept of what Goertzel refers to as comparative studies. So, I thought I would weigh in on the subject myself and lend a little support to him.

Most readers of SKEPTICAL INQUIRER are familiar with the distinction between inductive and descriptive statistics, but there is a different and far more relevant distinction to be drawn here, between what the great American statistician Edwards Deming referred to as *enumerative* versus *analytic* studies. Enumerative studies are those where action is taken on the frame—a set of objects from which the sample was drawn. Analytic (also referred to as comparative studies) are those where action is to be taken on the cause-and-effect system that produced the objects in the frame. There is an easy way to distinguish the two types of studies. A census (as opposed to a random sample) removes all the uncertainty from an enumerative study where it does not remove the uncertainty in an analytic study.

From this distinction, it is easy to see that in the study of capital punishment and its impact on homicide rates, we are engaged in an analytic study. This, because the recorded rates are a census of homicides, yet we still have uncertainty regarding whether capital punishment has an impact on homicide. Unfortunately, the methods and techniques taught in universities typically pertain to enumerative studies as opposed to analytic ones, and therefore, as is the case with the use of econometric models on capital punishment and homicide rates, it is easy to get caught applying the wrong technique. If you will permit an extended quote from Dr. Deming (*Out of the Crisis*, p. 132):

> The teaching of pure statistical theory in universities, including the theory of probability and related subjects is almost everywhere excellent. Application to enumerative studies is mostly correct, but application to analytic problems . . . is . . . deceptive and misleading.
>
> Analysis of variance, t-test, confidence intervals, and other statistical techniques taught in books, however interesting, are inappropriate because they provide no basis for prediction and because they bury the information contained in the order of production. Most if not all computer packages for analysis of data, as they are called, provide flagrant examples of inefficiency.

The point of all this is that when dealing with analytic studies, such as the question of whether capital punishment has an impact on homicide rates, we use different tools and techniques, usually emphasizing basic graphical displays of data to ensure analysis is not obscured by symmetric functions (such as averages) or by losing the "information contained in the order of production."

Figure 1 of the Goertzel article, which seemed to generate considerable debate, is precisely the way in which such data should be displayed—a very good example of a run chart. Inferences about the impact of capital punishment can be made only with some expertise in the subject matter combined with some judgment concerning the pattern of the data displayed on the chart. Goertzel overstates the case when he says such studies "consistently show the death penalty has no effect." Better to say that such studies have not been able to detect any significant impact, meaning capital punishment may have some impact, but it is so small as to be undetectable, which is essentially the right conclusion to be drawn from figure 1 in the article.

By the way, an article on the distinction between enumerative and analytic studies would make a great article for SKEPTICAL INQUIRER one day.

Robert M. Gerst
Calgary, Alberta
Canada

Many of the letters published in response to Ted Goertzel's excellent article on econometric modeling of capital punishment present flawed arguments.

The question should be whether a jurisdiction which presently executes death sentences will experience an increase in its murder rate if it abolishes capital punishment. There is good historical information suggesting an answer. The year before Canada's 1976 abolition of the death penalty, its murder rate was 3.09 per 100,000. It fell to 2.74 in 1983 and 1.86 in 2000, a 40 percent decline since the last threat of hanging.

Several letters commented on the threat of recidivism. Again, the question ought to be the predicted recidivism experience of a jurisdiction which ceases executions. A natural experiment presently is being performed in Illinois, where all 167 of that state's death-row prisoners had their sentences commuted in January, 2003; zero murders have been committed since then by the formerly condemned. Moreover, among the 558 who were moved off America's death rows by the 1972 Furman decision, there has been nearly zero recidivism.

George Rowell and some others draw a false dichotomy between execution and release. No prisoner has been or will be released from a sentence of life without parole.

The increasingly well-known reality of capital punishment, which includes its abandonment by almost the entire democratic world (including a significant part of the United States) and the exoneration of over a hundred death-row prisoners, leads increasing

numbers of Americans to conclude that capital punishment is not useful, accurate, or fair.

William Kreuter
Seattle, Washington

Columbia Prayer Study

I would like to thank Dr. Bruce Flamm for his helpful article on the flawed Columbia prayer study (September/October 2004). I'm sure he will resist the ugly pro-prayer, pro-CAM backlash. It would be great if Columbia retracted the study and apologized, but I doubt that will happen—they'll probably quietly remove everything, admit nothing, and hope the bad publicity goes away.

Unfortunately, people want to believe in the efficacy of prayer—as if we had such powers in the universe! Wouldn't the world look quite different if prayer actually had some effect in history?

Alison Lovell
New York City, New York

See page 52 in this issue for a follow-up by Bruce Flamm.

The letters column is a forum for views on matters raised in previous issues. **Letters should be no more than 225 words.** Due to the volume of letters not all can be published. Address letters to Letters to the Editor, SKEPTICAL INQUIRER. Send by mail to 944 Deer Dr. NE, Albuquerque, NM 87122; by fax to 505-828-2080; or by e-mail (send as e-mail text, not as an attachment) to letters@csicop.org (include name and address).

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THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION OF CLAIMS OF THE PARANORMAL

COMET MACHHOLZ, photographed the evening of January 6, 2005, by astronomer and CSICOP scientific consultant James McGaha, Director of the Grassland Observatory, Tucson, Arizona, as it passed near the Pleiades (lower left). "This was a rare opportunity to image a bright comet near a beautiful young star cluster," McGaha says. The Pleiades is a young (about 100 million years old) open star cluster containing approximately 3,000 stars at a distance of 425 light-years. The brighter stars are about 1,000 times brighter than our sun. Comet Machholz, discovered August 27, 2004, was 52.5 million kilometers from Earth when imaged here, 0.35 the distance from the Sun to the Earth. It displays two tails, a brown dust and a blue ion tail. McGaha used the Grasslands 24-inch telescope and a digital camera in a 10-minute exposure.

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